X-Ray Mag

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SOUTH AUSTALIA
Rapid Bay Jetty

COVER PHOTO BY DON SILCOCK

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COVER PHOTO: *Leafy seadragon, Rapid Bay Jetty, South Australia,* by Don Silcock (**indopacificimages.com**)

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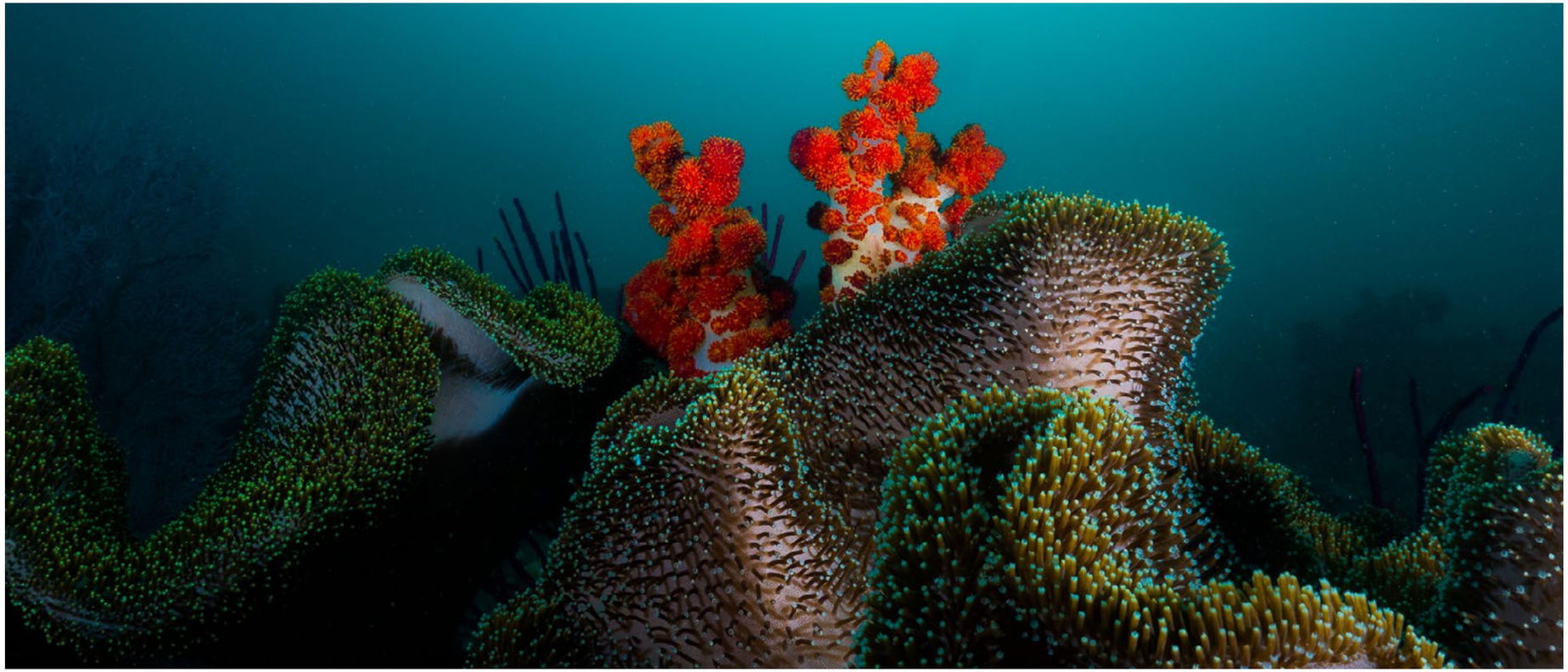
Triton Bay, West Papua, Indonesia. Photo by Claudia Weber-Gebert



columns...

plus...

Beaches & Butterflies

This summer I went back to the beach where I spent most of my summers as a kid. It is my happy place. The beach is clean, the sand is white, and the ocean is generally lovely—and there are rarely many people.

There are small children with red buckets and blue shovels, building sand castles or trying to catch small shrimp or tiny crabs in the shallows. The older ones joyfully play in the waves. Meanwhile, their grandparents enjoy a leisurely swim or just bobbing about.

It is as if time has stood still. At a glance, the scenery is exactly the same as half a century ago when I was one of those little toddlers myself, and it was my grandparents who brought a picnic basket with lemonade and sandwiches.

Yet, something is markedly different, and I am not referring to the fancy wetsuits and rashguards some kids are wearing now; we surely did not have those back then. Nature has changed. As we spent much of our long and carefree childhood summer days playing on the beach, we would also find all kinds of interesting stuff washed up on the shore.

We found many different seashells, sponges, crabs and the assorted stranded fish drying up in the sun—frequently small dogfish. On rare occasions, there was a skate or even a stranded marine mammal, such as a porpoise, which we would marvel at endlessly. Characteristic egg capsules from sharks and rays would often be entangled in the dry seaweed. It was an exciting playground and one that was instrumental in forming my life-long bond and interest in the aquatic environment.

The beach is still stunning, the water is still awesome and very pleasant. Only, there is much less stuff to find, and the ecosystem is obviously poorer or profoundly changed. I notice because I have the benefit of this hindsight, coupled with my formal education as a biologist. But who else notices? The current state of affairs has just become the new norm.

When a new normal replaces the old and becomes the accepted standard or yardstick, we are experiencing **shifting baselines**.

As in this simple case, it is mostly a gradual process that takes place over many decades or generations, which is why we do not notice. That is, unless we have historical records, documentation or images against which we can compare the present-day situation with the past.

That the general public does not notice the difference or is even unaware of this sliding impoverishment of our once plentiful natural resources is bad enough. Shifting baselines also affect present-day and future environmental scientists, politicians and decision-makers, none of which know how the natural state of our wild habitats are supposed to look like anymore, because they have never experienced ecosystems and habitats in their healthy, steady state.

At times, it is easy to despair and feel overwhelmed, say, when we learn that the mighty Great Barrier Reef has been severely damaged by unprecedented marine heat waves. Climate change is indeed a daunting challenge and probably the biggest one ever faced by humanity.

Can ecosystems be nursed back to better health? Can we become better stewards of our natural resources while we carry on developing modern societies and driving economies?

I think so. At least sentiments appear to be changing fast. On the grander scale, the massive EU recovery fund is, for example, linked to climate change mitigation projects and addressing "Green Deal" matters. The European Union is also planning to prohibit sales of new petrol and diesel engine cars from 2035.

On a much smaller but equally important scale, greening cities and rewilding suburbs is not only providing wildlife with some much-needed new habitats, but just as importantly, is also bringing a new appreciation of wild nature, possibly showing a viable way of blending infrastructure with nature, without compromising either.

I suppose only time will tell. In the meantime, my spirits have been significantly lifted by having several butterflies, bees and even a couple of elegant dragonflies fly in and out of my downtown office this summer. This is probably thanks to the new urban gardens and the restoration of the city's lakes.

— Peter Symes
Publisher & Editor-in-Chief

Edited by
Peter Symes

from the deep

NEWS

Fish trust friends in a crisis

The presence of "friends" versus "strangers" affects how fish respond to a predator threat.

In social animals living in the wild, individuals rely on their buddies to alert them if a predator is lurking.

All animals aim to balance the risk of predation against the energy investment necessary to execute an escape, to maximise the number of correct reactions (e.g. reacting to the presence of a predator) and minimise reactions to inaccurate information (e.g. reacting to harmless stimuli).

While we typically attribute the long-lasting bonds of social familiarity to complex thinkers like humans, growing evidence indicates that we underestimate the importance of friendship networks in seemingly "simple" animals, like fish, and its importance for survival in the wild.

Fast-start response

In fish groups (i.e. schools), individuals also depend on social cues to survive. One of the main forms of defence from predation in fish is the fast-start response, which is a rapid, anaerobically driven acceleration, typically in response to a threat stimulus.

Scientists studied how the presence of "friends" versus "strangers" affected how fish responded to a predator threat. Using social groups of the tropical damselfish *Chromis viridis*, researchers tested how familiarity through repeated social interactions influences fast-start responses.

In stable social groups, familiarity develops through repeated interactions among individuals, allowing them to acquire knowledge of group-mates' behaviour in various contexts (e.g. feeding, defence) and to develop an individualised role within their group.

Conversely, unfamiliar individuals pose a number of threats to a stable group, such as harm to offspring or competition for resources.

A matter of trust

The presence of "strangers" seemed to distract fish, making them react more slowly and greatly increasing the chance that they would become lunch for a hungry predator when in the wrong social scene.

The scientists believe that their results come down to trust. Individuals will alter their sensitivity to social information based on the level of familiarity in the group and hence trust in the information's accuracy.

"Trust among individuals is critical. This is true for humans as well as many other species, including fishes," said study co-author Jacob Johansen, Ph.D. ■ SOURCE: NATURE COMMUNICATIONS BIOLOGY

DAVID BURDICK / NOAA / CC BY 2.0

Chromis viridis (green chromis) is a species of damselfish.

Edited by
Rosemary E Lunn

World's deepest pool opens in Dubai

It is clear that the team behind Deep Dive Dubai (DDD) instantly dismissed the standard sterile swimming pool setup. Instead, a surreal, intriguing sunken cityscape has been created, that engages divers sense of play, fun and fantasy.

State-of-the-art lighting and sound systems have been fitted inside the pool to create different atmospheres, and the pool itself has been dressed and staged. Various brick walls are covered in graffiti, trees and vines grow up structures, and there is the opportunity to play pool in the pool, whilst being watched by a full-sized Star Wars Stormtrooper. Explore a little farther and divers will find two underwater habitats at 6m (19.6ft) and 21m (68ft), along with abandoned apartments, a library and a garage, complete with a vehicle.

The stats

It takes 14 million litres of 30°C (86°F) freshwater to fill the 60m (~196ft) deep pool. It is very clear that DDD has set the bar high and redefined what an indoor dive destination can offer.

This will be a useful tool for preparing divers for challenging open water and overhead diving conditions.

Spectators

DDD has not forgotten the non-diver. Diving will now become a spectator sport, because the pool can be viewed through vast glass windows, or via video feeds, because the pool is covered by 56 cameras.

These cameras have a threefold purpose: safety, education and entertainment. Primarily the feed is watched at the dive control station by the dive supervisor, enabling them to help keep the diving safe because they can remotely monitor all areas inside the pool. The video feed is also shared on large monitors that are situated throughout facility. DDD can also edit video footage captured during a guest's dive, to be shared with them after they complete their visit.

DDD states that it will be offering a variety of experiences covering all kinds of diving and training. From try-dives through to recreational and technical. There will be freediving for qualified divers and rebreather diving. The facility even boasts an artificial cave diving training area.

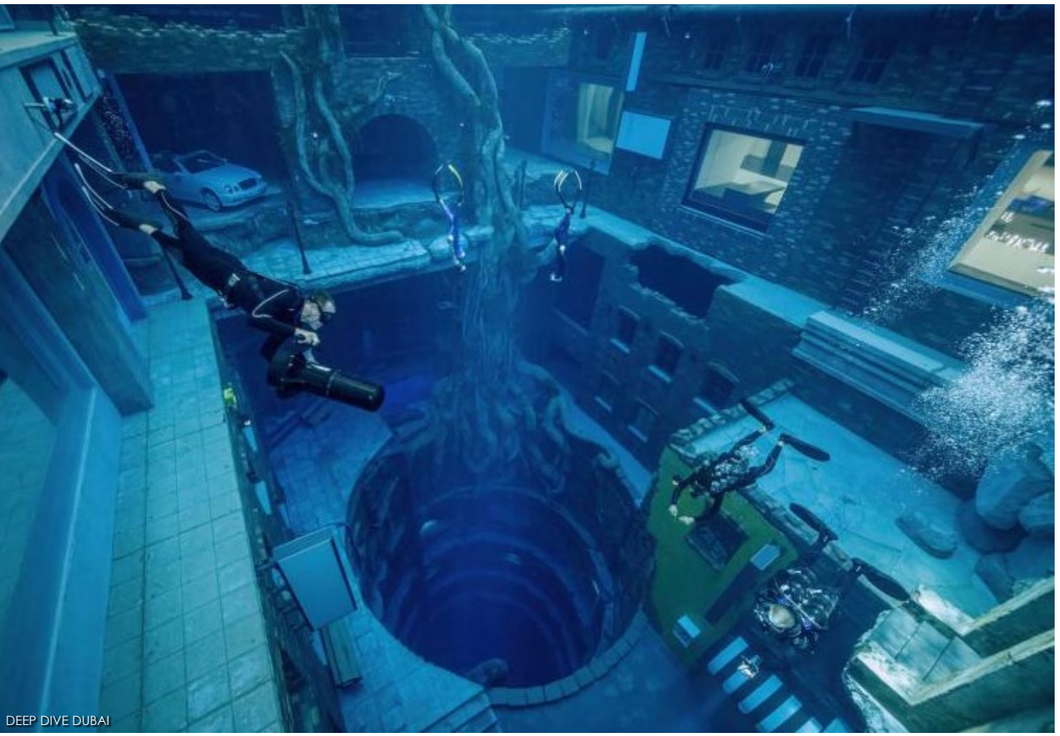
Guinness Book of Records

It really shouldn't be a surprise that DDD is officially a record-breaking attraction. The United Arab Emirates city is known for its luxury shopping and ultramodern architecture. It is already home to the world's tallest skyscraper (the Burj Khalifa) and the world's largest (and aptly named) Dubai Mall. Now Dubai is home to the deepest dive pool in the world too.

The depth claim is not just marketing fluff, it is measured fact. On 27 June 2021, the *Guinness Book of Records* confirmed that Deep Dive Dubai (UAE) is "the deepest swimming pool for diving" at 60.02m (196ft 10 in).

Its nearest competitors include Nemo 33 at 34.5m (113ft) in Brussels, Belgium, which held the deepest indoor swimming pool in the world record from 1 May 2004 to 5 June 2014. The title then passed to Y-40 at 42.15m (138ft) in Padua, Italy, on 5 June 2014. On 25 November 2020, Deepspot at 45m (148ft), near Warsaw, Poland, gained the title. It was permitted to open despite Poland's strict Covid-19 rules. A potential competitor could be the Blue Abyss, but this British 50m (164ft) facility is yet to break ground. ■

SOURCE: DEEP DIVING DUBAI



Verified by Guinness World Records, Deep Dive Dubai is currently the deepest pool on earth.

wreck rap

A warship ram is an appurtenance fixed to the front of the vessel and designed to damage enemy ships when struck. It was possibly first developed by the Phoenicians as early as 1200 B.C., but its importance was most clearly emphasized in Phoenician, Greek and Roman galleys (seagoing vessels propelled primarily by oars).

Text by Amanda White
Photos courtesy of Mario Arena, Peter Brandt, Kirill Egorov, Ali Frkee, Luca Palezza, Claudio Provenzani, Derk Remmers, Craigh Walker, The Egadi Project and RPM Nautical Foundation

Battle of the Egadi Islands

— Ancient Discoveries Off Sicily

DERK REMMERS

Since 2017, a team of divers from Global Underwater Explorers (GUE), along with Soprintendenza del Mare (Superintendent of the Sea) and the RPM Nautical Foundation, has been involved in archaeological investigations at the site of the Battle of the Egadi Islands in Southern Italy.

The Battle of the Egadi Islands (also known as the Battle of the Aegates) was fought between the ancient Roman and Carthaginian naval fleets on March 10 in 241 B.C. The battle between the two fleets involved more than 500 ships and ended with a decisive victory for the Romans. It was also the last battle of the First Punic War, which had lasted 23 years.[1]

[1] RPMNAUTICAL.ORG/PROJECTS/EGADI-ISLANDS-PROJECT

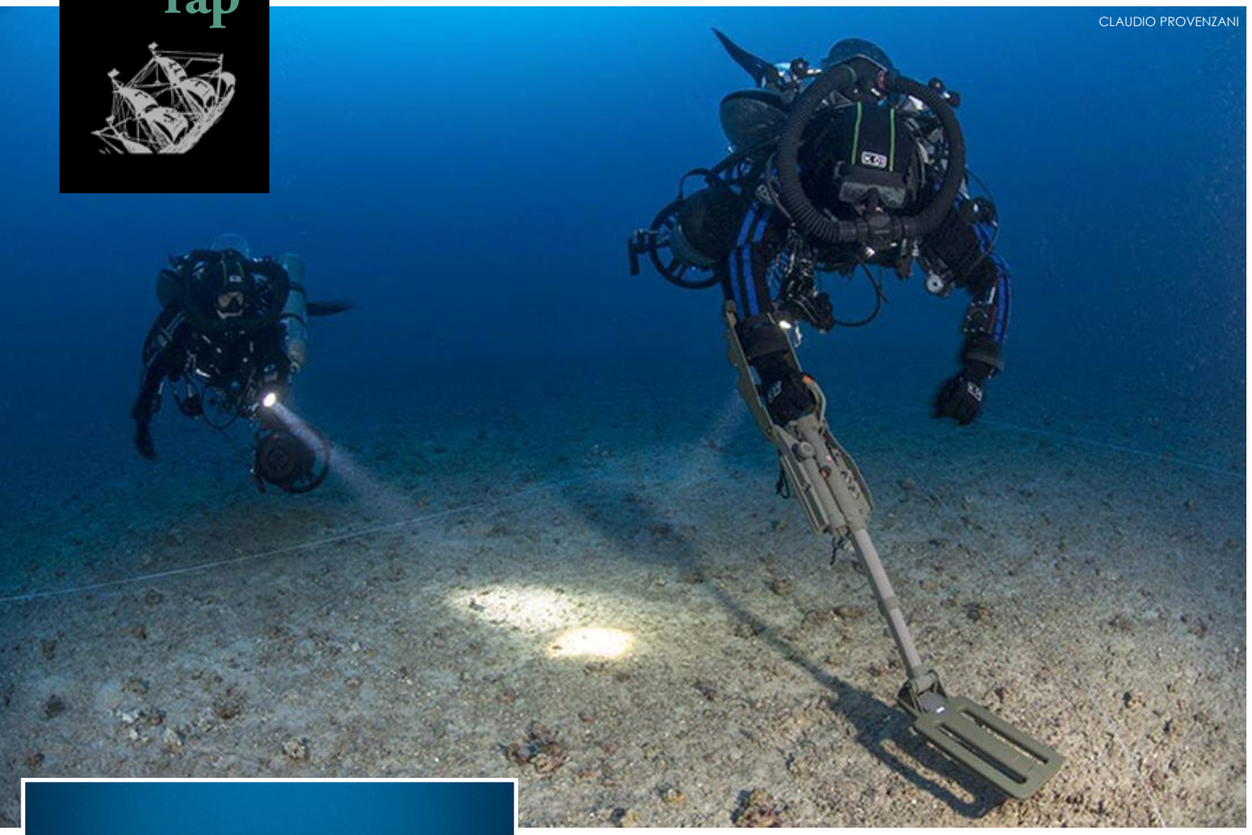
During the past five years, the GUE Egadi Project dive team has completed 32 missions. During this time, they have made 101 team dives and 263 individual dives, which is equivalent to about 10 days of bottom time and about 38 days of decompression time. That's a lot of time underwater!

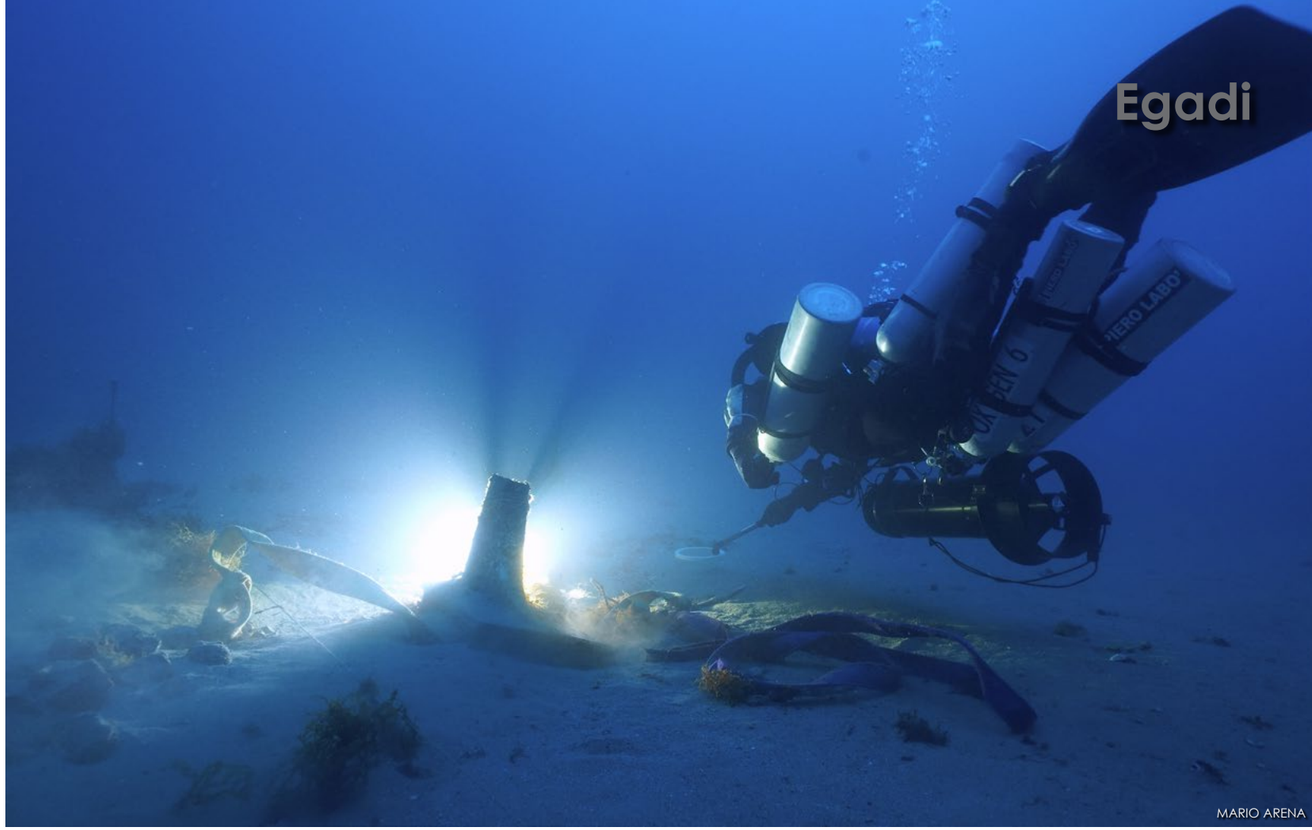
I recently had a chat with Mario Arena, one of the project leaders alongside Chicco Spaggiari, about their ongoing underwater efforts to recover a key part of human history.

AW: How did you both get involved in the Battle of the Egadi Islands research?

MA: Chicco and I have collaborated with the Sicilian archaeological authorities (Soprintendenza del Mare/SOPMARE) for twenty years, and we have participated in several significant projects together. We knew about the impressive discoveries at the site of the Battle of the Egadi Islands, and it was a dream come true for us to contribute to this research. The opportunity began when a specific artifact, a bronze warship ram, needed to be lifted. It was mostly buried and challenging for RPM's ROV (remotely operated vehicle) to dig out. Chicco was maintaining subtle but constant pressure on the archaeologists to involve us in the Egadi battlefield,

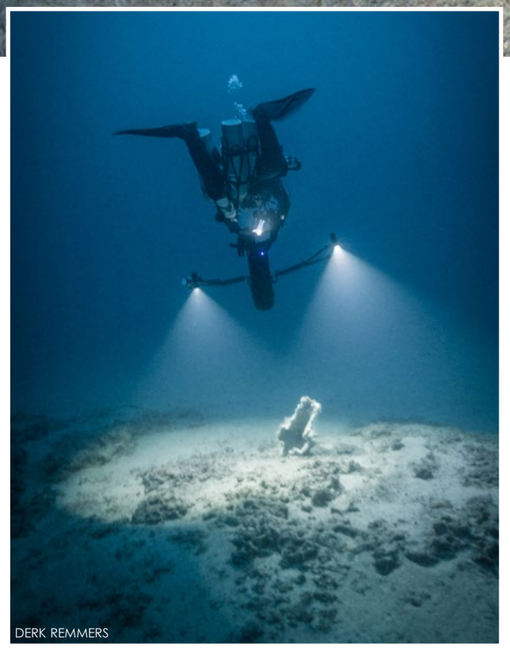
The use of metal detectors by the divers (below) has been a game-changer for finding artifacts that not only would have been missed by the sonar but also would have been missed by the diver's surveys.


CLAUDIO PROVENZANI



MARIO ARENA

There is something very magical about discovering pieces of ancient human history (above). The use of modern technology (rebreathers) collides here with the technology of 241 B.C. (the ram).


DERK REMMERS

Each artifact is carefully photographed before being removed. Here we can see a ram jutting up out of the sand

so when the day came that they finally asked, we were happily onboard.

AW: Why is the Battle of the Egadi Islands such an important moment in history?

MA: The archaeological site is of incredible importance since it is the only ancient (over 2,000 years old) battlefield, terrestrial or naval, that has been discovered to date. It offers a unique opportunity to learn about the military culture of the time. The battlefield also represents an important moment in Roman history, since Rome—which at that time was still an emerging power—prevailed in a 23-year-long war against the Carthaginian Empire, the predominant power at the time. Even more importantly, it signaled Rome's complete dominion over the sea. This was the event that enabled Rome to build the incredible empire we all know. It is also the first time that historical sources narrating huge and significant battles can be confirmed with sound archaeological evidence.

AW: How has RPM's work benefited from having a team of highly skilled divers to assist them?

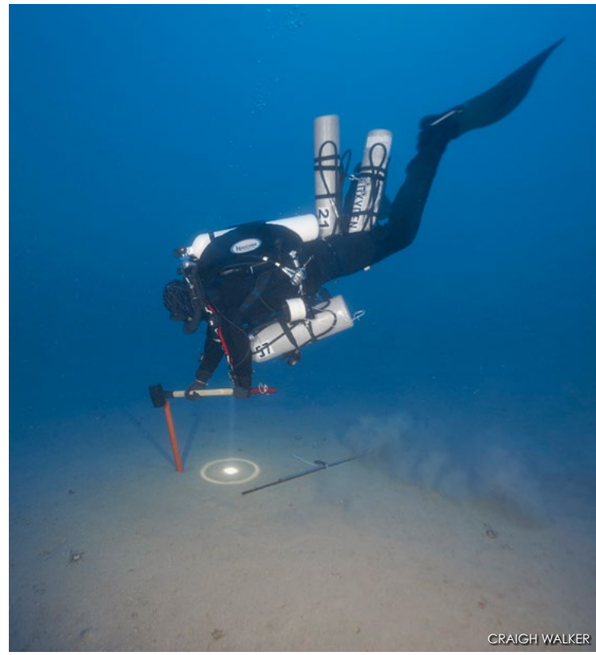
MA: Let me first say that RPM's underwater archaeology operation is incredibly efficient. They use state-of-the-art technology, they work with some of the best marine archaeologists in the world, and they had the stubbornness to keep searching the area for years before finally discovering the battlefield site. Italy and the whole field of archaeology owe them immense gratitude for what they did and for what they are still doing on this site.

Our GUE divers' contributions help the operation in several ways: First, we can offer a better eye for discovering artifacts in areas where the electronics lose most of their efficiency, like in rocky areas and under the sediments. In these conditions, the artifacts are hidden to the long-range "eyes" of electronics, which means they cannot be targeted for investigation with the ROV.

AW: How do the divers find things? It sounds like a lot of scootering.

MA: The teams of divers systematically explore the seafloor, visually or with metal detectors. Divers are more efficient, quicker and more delicate than the robotic arms and tools of the ROVs in uncovering artifacts that are partially or completely buried and preparing them to be lifted to the surface.

We are also more efficient in setting up grids and sectors, performing photogrammetry—artistic pictures and videos offering quality documentation

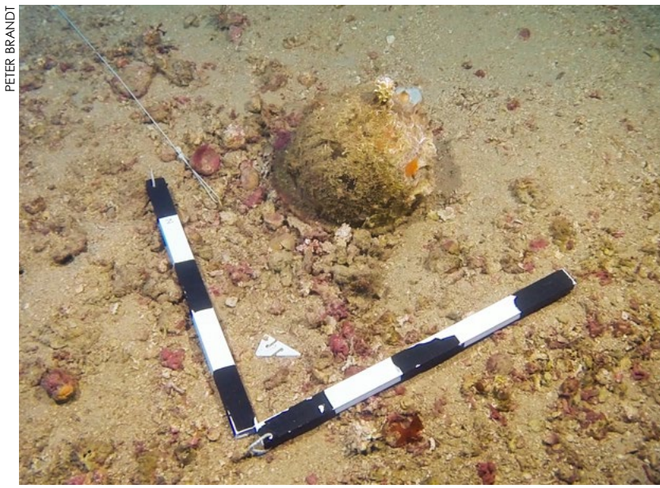

GRAIGH WALKER

A diver hammers in a starting point for the transect along the seafloor to look for relics from the battle. The dive team is trained to systematically search areas of the ocean floor.


CLAUDIO PROVENZANI

EGADI PROJECT

It is very exciting when discoveries like this one are made, and the item is almost fully intact. Here a helmet has just been brought to the surface (above); Two divers work together to recover a bowl, using a lobster's net to ensure its safe recovery (left).


PETER BRANDT

Artifacts are documented thoroughly by the divers before any removal takes place. Here the Montefortino Helmet is being photographed by the team for the researcher before being taken to the surface.


EGADI PROJECT

A buried and broken helmet that once belonged to a soldier is documented before it is recovered. It is interesting to see how other sea matter, such as shells, collect around or on the artifacts.

of the artifacts on site—and managing the operations. These are all important contributions to the archaeologists' investigations.

AW: How have metal detectors changed the way your dive team works underwater?

MA: They shifted a lot of our attention to what is below the sediment, opening a new frontier for the investigation of this site. We rely on metal detectors mostly for smaller items, like helmets, swords, parts of armor, coins, nails and other less visible artifacts. It is true that bigger artifacts, like warship rams or anchors, could be found completely buried. But you never know, since a few rams were found buried up to 80 or 90 percent of their volume. It is very thrilling.

AW: Was there a lot of trial and error involved in finding the best way to search for possible artifacts?

MA: Let's say that we had to invent and test a lot. The nature of this site is very different from a simple wreck. Here, we were working on an area that measures at least 4km (2.48mi) by 3km (1.86mi), and the battle's debris is spread throughout this area with no logical order. Such a site would present archaeological challenges on dry land, and it was even more difficult in the middle of the sea at a depth of 80m (263ft).

AW: Can you describe the process of artifact recovery?

MA: It varies according to different artifacts and depending on the conditions in which they are found. Generally speaking, it is very important to record the artifacts' positions and to document their status when found before moving or removing them. It is also important to have a stabilization and preservation plan ready before recovering an artifact.

AW: I understand that you used a dredging tool called the SUEX-Rosa. Can you explain how it works and how it helped with the archeological recoveries?

MA: It is a great tool that allows us to vacuum the sediment of the sea bottom away from an artifact. The concept was invented by a project team member, Cristiano Rosa, and then refined and developed by SUEX, an Italian company and leader in manufacturing underwater propulsion vehicles. Its working principle is based on the use of a DPV and the suction that the propeller creates on the front side, opposite the propulsion side. This suction is conveyed through flexible piping used for vacuuming the sedi-


KIRILL EGOROV

Can you spot the ram? The dive teams have been trained to know what to look for as often the artifacts are buried in the sand partially and/or covered with sea life, as they have been on the ocean floor for almost 2,200 years.

ments. It is pretty effective, and an incredible feature is that it is self-contained and can be carried by divers. Normally a dredge would require a pontoon, with a four-point mooring or a dynamic positioning system, and dozens of meters of piping connecting to the surface. Cristiano invented a brilliant tool.

AW: What were the feeling and mood when that well-preserved and finely decorated helmet was found last year?

MA: These kinds of finds are incredible and unexpected. The most exciting thing is that you really do not know what else will be discovered at that site. I think that we still have plenty of impressive artifacts to find.

AW: How has the environment of the battle location impacted the project?

MA: Well, it is a very challenging environment. Besides the depth, it is in the middle of the sea in an area where strong currents are always present. We keep trying to refine procedures, but the very high skill level of the divers involved is integral to getting the job done.

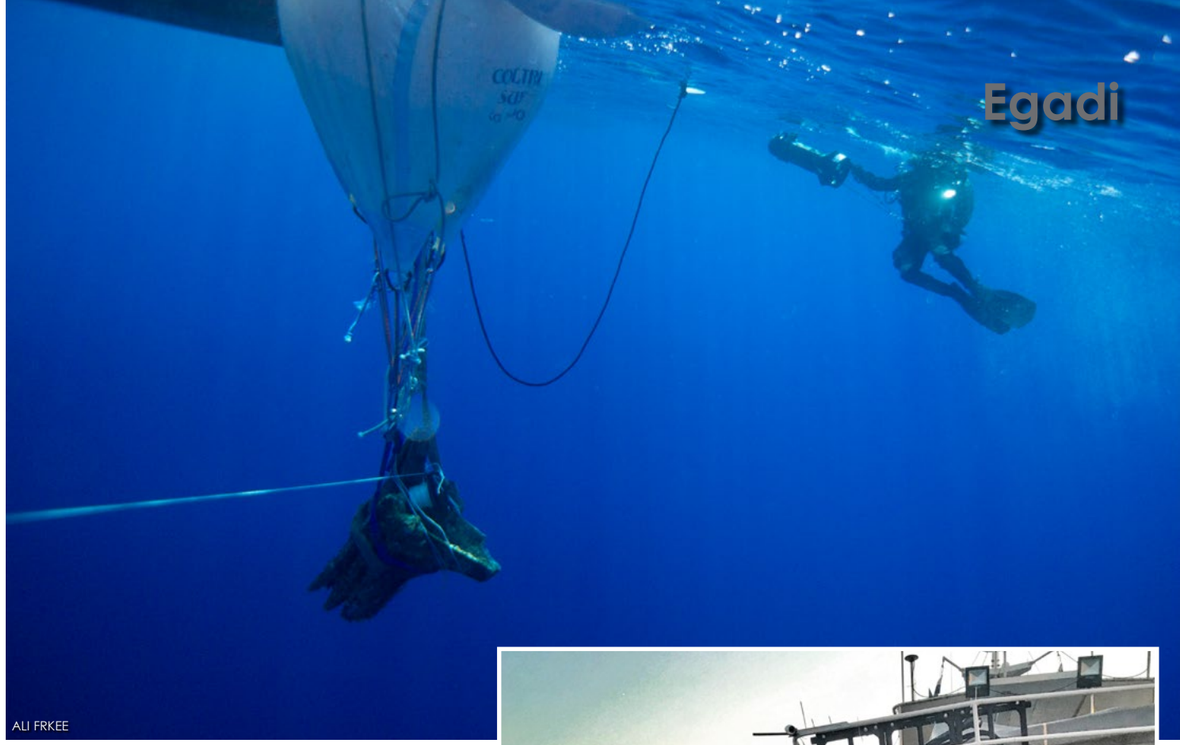
AW: Has photogrammetry helped with studying the artifacts?

MA: Photogrammetry is an important tool for the archaeologists, as it enables them to see the artifacts from any perspective and to measure dimensions and distances. It is much more than a simple picture; it is a scaled 3D model of the object.

AW: Where do the recovered artifacts go? Are they being studied or are they publicly displayed?

MA: Both. They undergo a process of stabilization and restoration first, and


KIRILL EGOROV



ALI FRKEE

The rams are brought to the surface using rope netting and a giant lift bag (above); CCR diver Derk Remmers prepares this ram to be lifted out of the water so that it can be studied by SOPMARE (left).


RPM NAUTICAL FOUNDATION

Chicco Spaggiari (left) and Mario Arena (right) the two leaders of the dive team project have dedicated themselves to the success of this research for the past five years.

EGADI PROJECT

Most of the helmets discovered from the battle are not fully intact. The artifacts have a beautiful way of looking both human-made and part of the sea.

then are (or will be) analyzed and studied by scholars and specialists in different disciplines. The final destination is the Museum of the Tonnara of Favignana, which is a spectacular facility that we hope will someday include the Museum of the Battle of the Egadi. The most magnificent artifacts, like the warship rams and the best-preserved helmets, for example, are often on tour, being displayed in dedicated exhibitions in museums all around the world.

AW: Can you describe what a typical day on the project is like from start to finish?

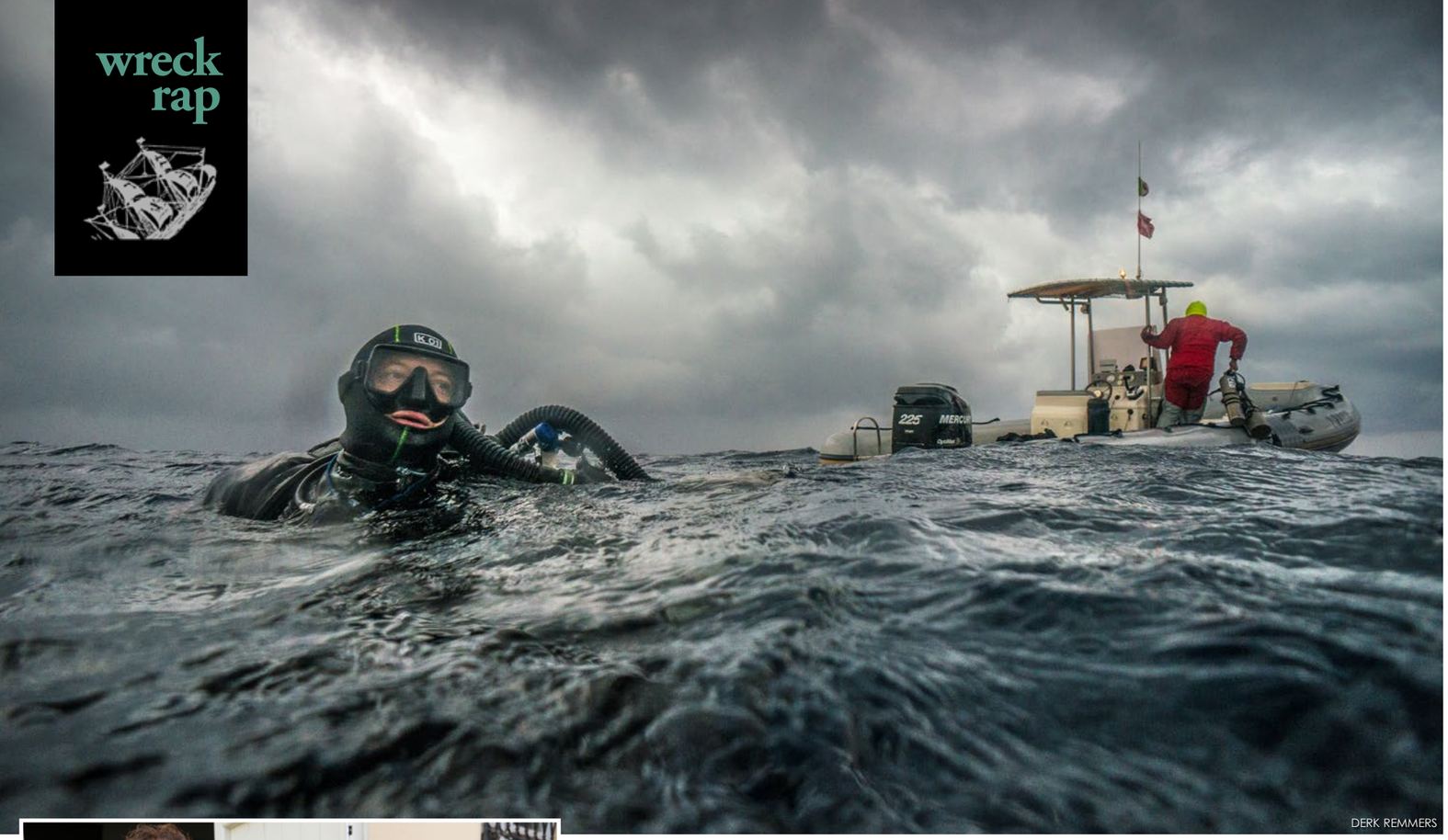
MA: It is a demanding routine. We normally meet around 7:30 a.m., after breakfast, to refine a plan for the day and complete preparations. We load the boat at 8:30 and try to leave the dock between 9:00 and 9:30. We are on site by 10:30, and divers hit the water around 11:00. Dives last for four to five hours, so we are out between 3:00 and 4:00 p.m. and are back in the harbor and unloaded between 4:00 and 5:00 p.m.

At that point, we still have to fill tanks, conduct rebreather checks, charge batteries, unload and organize the team reports, discuss the results and plan for the next day. Then we eat, sleep (hopefully by 10:00 p.m.) and then repeat.

Ideally, we would like to do three days on and one off, but we typically go anytime the weather allows. Last year, we did two days of diving and one day off, seven days of diving and three days off, and then five days of diving. I have lost 5kg (11 lb) of weight as a result!

AW: What was one of your favorite moments in the past few years of this project?

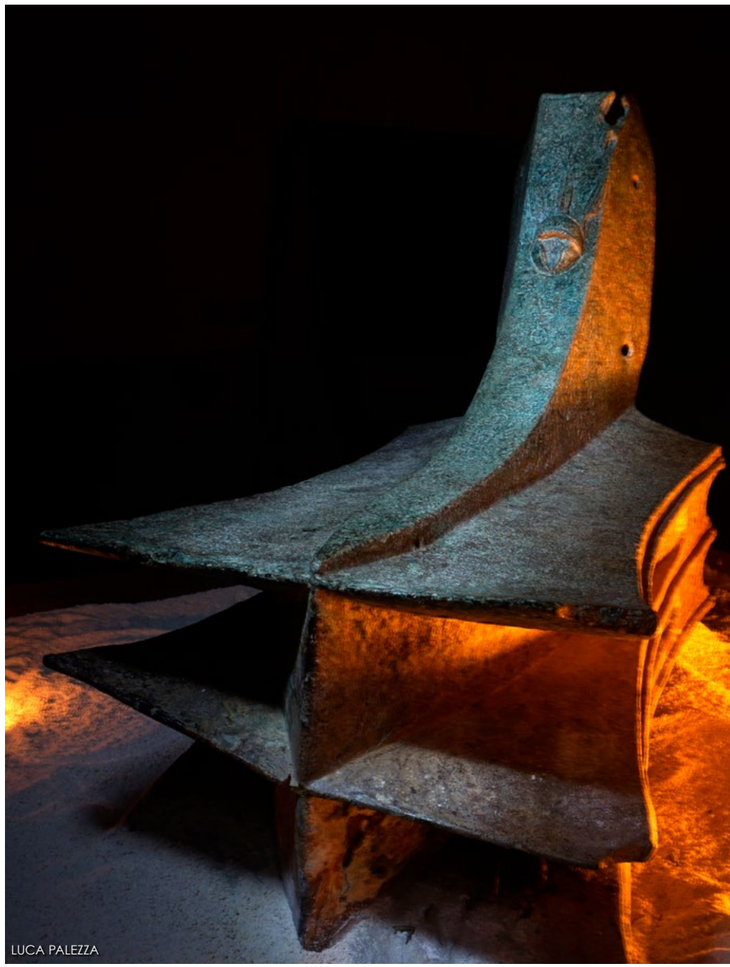
MA: I love when we sail out to the site at high speed with the team. It feels as if I am going to battle. Also, the days when we recover rams to the surface are special.



DERK REMMERS

EGADI PROJECT

It takes an entire team of divers to make projects like this one work safely and effectively (above). There are rebreather divers, photographers, boat captains, surface support, gas fillers, safety divers, and others who help.



LUCA PALEZZA

A ram on display at the Museum of Favignana

EGADI PROJECT

Diving in the open sea can be complex for the team during the project (above). Often the dive teams have to miss days due to the conditions; Chicco (left) and the late Dr Tusa (right) bond over the discoveries (left inset).

AW: How can divers get involved with the project? What are you looking for in team members?

MA: Chicco put it nicely this year saying, "We want you all, but planning to participate in this project is like planning to run the New York City marathon. You have to prepare for it, seriously, and train for it the whole year. For working on the bottom, we seek GUE rebreather divers with solid experience diving at sea."

Standardization of equipment and procedures are important in such a complex and challenging operation. We prioritize photographers and videographers, people with expertise in photogrammetry, survey methods, fixing equipment, and those kinds of engineer-type skills. Medical backgrounds are also a plus, as well as a boat license.

We would also like to have more safety divers, and for this role, we require a GUE Tech 1 or 2 certification, or new GUE rebreather divers.

AW: How has the pandemic impacted the Egadi project?

MA: Of course, it impacted the project, but we have been very happy to be able to make it run, even if we had a reduced team. Chicco and I just kept our heads down and stayed motivated to try to make it happen. All the team members from outside Italy were not able to join, and we had a total of six divers during the three weeks of operation in 2020. Nonetheless, it has been a very successful campaign.

AW: What are your future plans for the project? What remains to be done?

MA: We hope to keep being involved in the investigation of this site for many years to come, and we have already organized a 2021 campaign. I think we have only scratched the surface on this site, and that discoveries will keep surprising us for years to come. There is still a lot to learn. ■

For more information, please contact Mario Arena at ***mario@gue.com*** *or Chicco Spaggiari at* ***chiccospaggiari@gmail.com****. Learn more and follow along with the developing discoveries at:* ***facebook.com/BattleofEgadi****.*

ISEAS–YUSOF ISHAK INSTITUTE

Octagonal serving dishes in perfect condition from Shipwreck 2

Salvage operation leads to large haul of blue-and-white porcelain

Amongst the artefacts recovered from two wrecks in Singapore waters is the world's largest haul of blue-and-white porcelain recovered from a documented shipwreck.

In 2015, commercial and salvage diver Ahmad Qamarulhazman was clearing debris underwater near Pedra Branca island, 24 nautical miles east of Singapore, after two bulk loader cranes that were in danger of toppling were blown up.

On his final dive of the operation, he spotted something wedged between rocks 8m deep. His trained eye told him that it was not something natural, but it was tough to see what it was as it was encrusted with algae, molluscs and organisms.

After their work, some of the divers returned to the site and retrieved several ceramic plates, not knowing what they were. The next day, after reading a newspaper report, Ahmad realised that the plates they recovered resembled a plate found at an archaeological dig in the mainland.

His find that fateful day eventually led to the discovery of not one but two shipwrecks in the vicinity—and the world's largest haul of blue-and-white porcelain from a documented shipwreck.

ISEAS–YUSOF ISHAK INSTITUTE

Blue and white bottle from Shipwreck 1

Recovering the artefacts

Teams from the Archaeology Unit of the ISEAS-Yusof Ishak Institute were sent to investigate and survey the site, and to conduct salvage operations of the artefacts, which turned out to be from a shipwreck 100m northwest of Pedra Branca.

This wreck was named Shipwreck 1, and was found to contain Chinese ceramics that possibly dated back to the 14th century.

The salvage operations took place over several years. Things moved slowly but steadily, as the divers had only a window of several hours of diving time in a day, and this was still dependent on weather and oceanic conditions.

At a press conference in June 2021, Dr Michael Flecker, a visiting fellow at the Institute, said that the shipwreck seemed to be contemporary with 14th century Temasek (old name for Singapore).

He added, "Apart from a large cargo of Longquan green-ware and other ceramics, she carried more Yuan Dynasty blue-and-white porcelain than any other documented shipwreck in the world. Many of the pieces are rare, and one is believed to be unique."

The artefact he was referring to was an intact blue-and-white bottle with a flanged straight neck.

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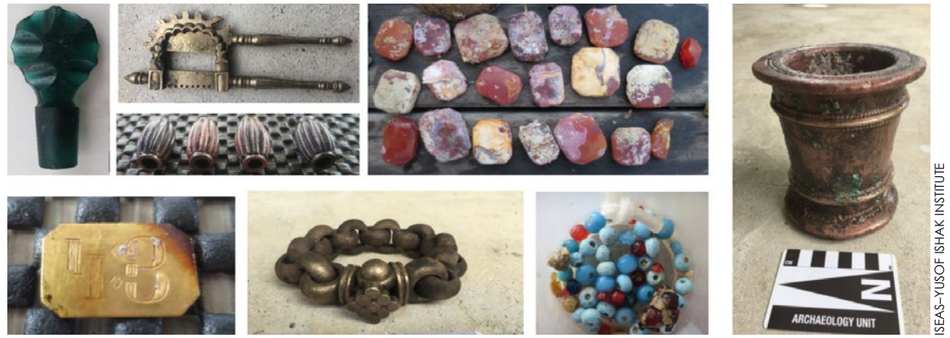
Diver with Longquan Ware (right); Range of artefacts from Shipwreck 2 (below)



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Second wreck found

In 2019, further detection surveys revealed the existence of another shipwreck, located 300m east of Pedra Branca. Named Shipwreck 2, this was believed to be the Shah Munchah, a merchant vessel built in India that sank in 1796.

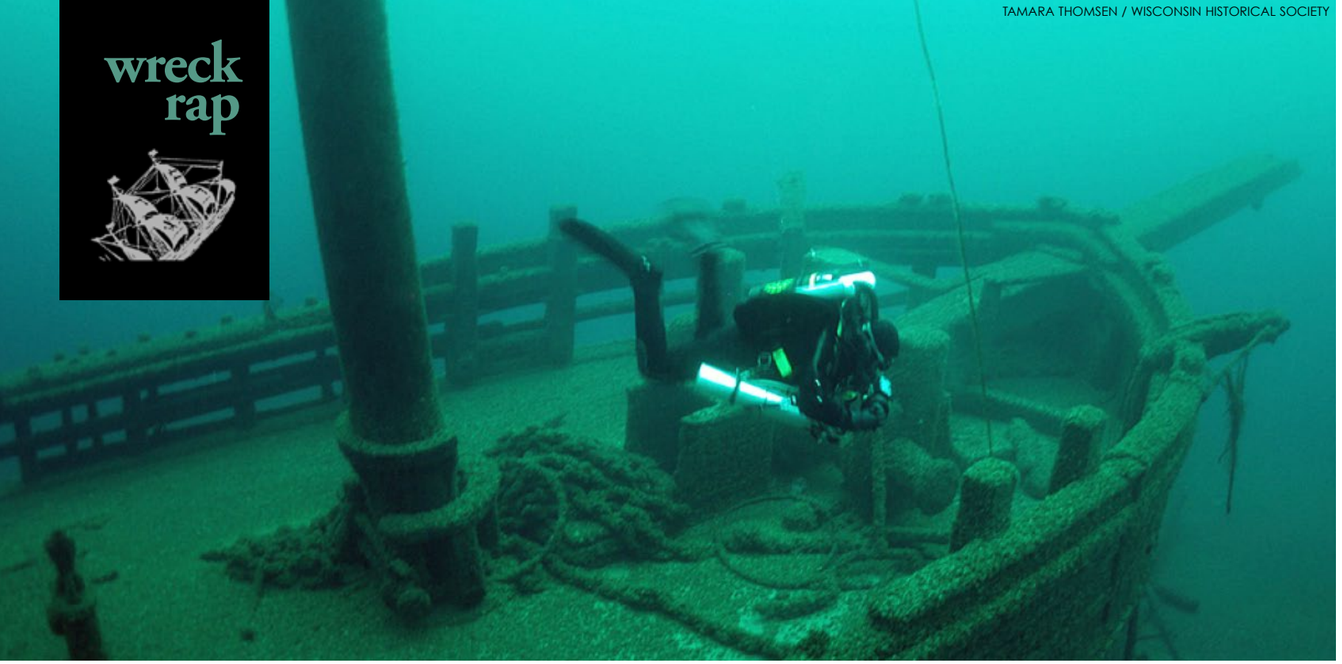
The artefacts retrieved from Shipwreck 2 included Chinese ceramics and non-ceramic artefacts such as copper-alloy, glass and agate objects, as well as the ship's anchors and cannons. These were recovered from 2019 to mid-2021.

Valuable insights into maritime trading history

The recovered artefacts are currently being stored and stablised. After desalination, they will be cleaned, conserved and catalogued. Once the conservation, research and documentation have been completed, the National Heritage Board will work towards exhibiting them in its museums, possibly from end-2021 onwards.

"The wide range and large quantities of artefacts from the two shipwrecks will bring invaluable insights into the maritime trading history of early Singapore and the region, reflecting the interconnectivity of pre-19th century Singapore," said Yeo Kirk Siang, Director of NHB's Heritage Research and Assessment. ■

SOURCE: ISEAS-YUSOF ISHAK INSTITUTE



TAMARA THOMSEN / WISCONSIN HISTORICAL SOCIETY

Diver swims over the two-masted schooner, *Walter B. Allen*, which sank in 1880.

New Wisconsin Shipwreck Coast National Marine Sanctuary established by NOAA

NOAA has designated the Wisconsin Shipwreck Coast National Marine Sanctuary—the United States' fifteenth and newest national marine sanctuary. It is located in Lake Michigan, along the coast of Wisconsin. It was created to protect shipwrecks considered nationally important archaeological resources.

At the time of its designation in 2021, the sanctuary included 36 known shipwrecks dating from the 1830s to the 1930s, including Wisconsin's two oldest known shipwrecks, the schooners *Gallinipper*, which was constructed in 1833 and sank in 1851, and *Home*, which was built in 1843 and sank in 1858.

Spanning the early 1800s through the 20th century, the shipwrecks represent a cross-section of vessel types that played critical roles in transforming the Great Lakes from a maritime frontier into the nation's busiest waterway. The ships carried grain and raw materials east as other vessels travelled west loaded with coal, manufactured goods, and settlers.

Co-managed with the state of Wisconsin, the sanctuary will also bring new opportunities for research, resource protection, educational programming, and community engagement. In partnership with local communities, the sanctuary will provide a national stage for promoting heritage tourism and recreation.

Upon designating the area as a sanctuary, NOAA announced that it would stay a prohibition on grappling into or anchoring on shipwreck sites in the sanctuary until 1 October 2023.

The delay in the imposition of this regulation was intended to give NOAA time to install mooring buoys that would make anchoring or grappling unnecessary, establish policies allowing access to shipwrecks where mooring buoys would not be installed, and explore the possibility of allowing some diving activities it originally intended to prohibit, such as allowing divers to attach mooring lines directly to some shipwrecks. ■

SOURCES: NOAA, WIKIPEDIA

A diver examines the remains of an ancient military vessel discovered in the Mediterranean sunken city of Thonis-Heracleion, off the coast of Alexandria, Egypt.

Egypt finds ancient military vessel

Divers have discovered a rare military vessel amid the sunken ruins of the ancient Egyptian city of Thônis-Heracleion—once Egypt's largest port on the Mediterranean—and a funerary complex illustrating the presence of Greek merchants.

Prior to the founding of Alexandria by Alexander the Great in the year 331 B.C., Thônis-Heracleion was the largest port city in Egypt, controlling the entrance to the country at the mouth of a western branch of the Nile River and dominating the area for centuries.

Destroyed and sunk, along with a wide area of the Nile delta, by several earthquakes and tidal waves, Thônis-Heracleion was rediscovered in 2001 in Abu Qir Bay near Alexandria, now Egypt's second-largest city.

The military vessel, discovered by an Egyptian-French mission led by the European Institute for Underwater Archaeology (IEASM), likely sank whilst loading huge blocks from the nearby Temple of Amun when the famed temple collapsed; the remains were discovered beneath 15ft of clay and debris from the building.

Measuring over 25m (80ft) long, the flat-bottomed ship had both oars and a large sail. While built in the classical Greek style, it also incorporates some Egyptian shipbuilding traditions.

In another part of the city, the mission revealed the remains of a large Greek funerary area dating back to the first years of the 4th century B.C., Egypt's tourism and antiquities ministry said.

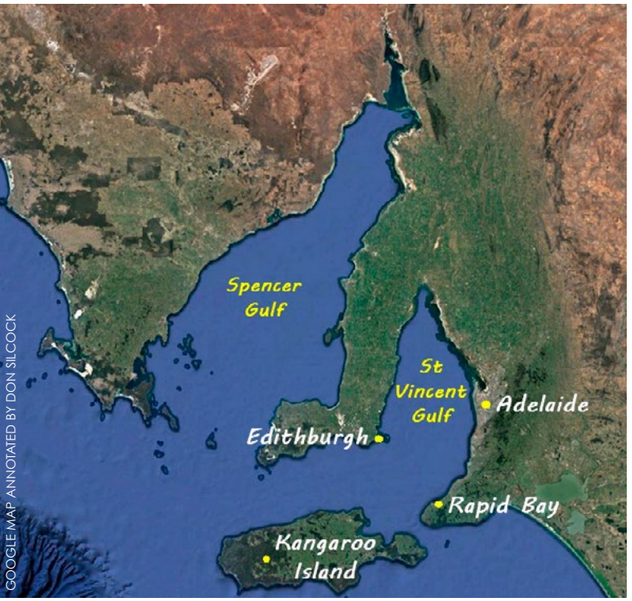
"This discovery beautifully illustrates the presence of the Greek merchants who lived in that city," the ministry said, adding that the Greeks were allowed to settle there during the late Pharaonic dynasties. ■ SOURCE: EGYPTIAN MINISTRY OF ANTIQUITIES

South Australia's Rapid Bay Jetty

— Home to Leafy Seadragons & More

Text and photos
by Don Silcock

Sweepers under Rapid Bay Jetty at the Tee (above); Aerial view of the jetty (top right); Eastern blue devil (right). PREVIOUS PAGE: Leafy seadragon



Map showing location of Rapid Bay in South Australia

There are two large, side-by-side jetties in Rapid Bay on the Fleurieu Peninsula, which are probably the most popular shore dives in South Australia.

Their convenient location, 100km south of the state capital of Adelaide, together with their sheltered position and great marine life makes them hard to beat. This is particularly true given the excellent chances of seeing the wonderful leafy seadragon of Australian while underwater here.

The original, much bigger jetty was built back in 1940 to allow exports from the nearby limestone mine, while the new and smaller jetty was opened in 2009. By far, the best diving is on the old jetty, particularly out at the T-section or "Tee" (aka the "Gallery" or the "Aquarium"), as it is often referred to. But the old jetty is in poor overall condition and closed to public access. So, it must be accessed by entering the water at the end of the new jetty and then crossing over.

This is straightforward overall, but not without its challenges, as getting all your gear down the new jetty is quite a haul. Then, once underwater, there is a fair distance to be covered. So, navigation and air consumption need to be managed carefully. That said, Rapid Bay truly is a great dive and well worth all the effort involved.

History

The location is named after Colonel William Light's 162-ton survey brig, *Rapid*. Light was the South Australia Colonial Surveyor General, who made his first landfall on mainland South Australia here in September 1836.

Industry came to Rapid Bay in 1938 when BHP, the big Australian mining company, began quarrying limestone there, which was used as flux for the company's steel smelters at Whyalla, Newcastle and Port Kembla. The

The long walk to the end of Rapd Bay Jetty (above); School of old wife fish under the jetty at the Tee (left); Curious leatherjacket fish under the jetty (right); Aerial view of Rapid Bay Jetty (bottom left)

original "BHP jetty" with its bulk-loading capability entered service in 1941, which continued through to 1988 when work was scaled down in favour of the company's Klein Point Quarry over on the Yorke Peninsula.

The ship-loading facilities were dismantled and the quarry left a rather large hole in the ground. No real records are available on the biodiversity of the jetty prior to its closing. But it seems clear that the years since have allowed the aging pylons and overall structure to positively bloom!

However, as it aged, it also became increasingly less safe, and was finally closed to the public on Christmas Eve 2004. The new jetty was built by the state government, after an intense lobbying campaign, and came at a cost of AU$3.9m. It was formally opened to the public in 2009.

While that lobbying was strongly supported by the Scuba Divers Federation of South Australia (SDFSA), it would seem that the South Australian Recreational Fishing Advisory Council (SARFAC) was the driving force (i.e., "I fish and I vote") behind it all. At the end of the day, what really mattered was that the new jetty was built, with tacit recognition by the politicians of the day that these structures were incredibly valuable.

Marine life

So, what is underwater at Rapid Bay? "Quite a lot" is the answer to that question! While many divers and underwater photographers visit Rapid Bay to see the iconic Australian leafy seadragon, there is much more to see. It is easy to burn all your air with the leafy seadragons (tempting as it is) and miss out on all the other stuff!

The pylons of the old jetty are testament to the rich seasonal upwellings created by the Leeuwin and Flinders Currents of southern Australia. While they lack the incredible density and almost biblical scale of those at Edithburgh Jetty, across the Gulf of St Vincent, Rapid's pylons have much to offer.

The closing of the limestone mine and the cessation of industrial activity

Sweepers, old wife fish, and zebrafish under the jetty (above)

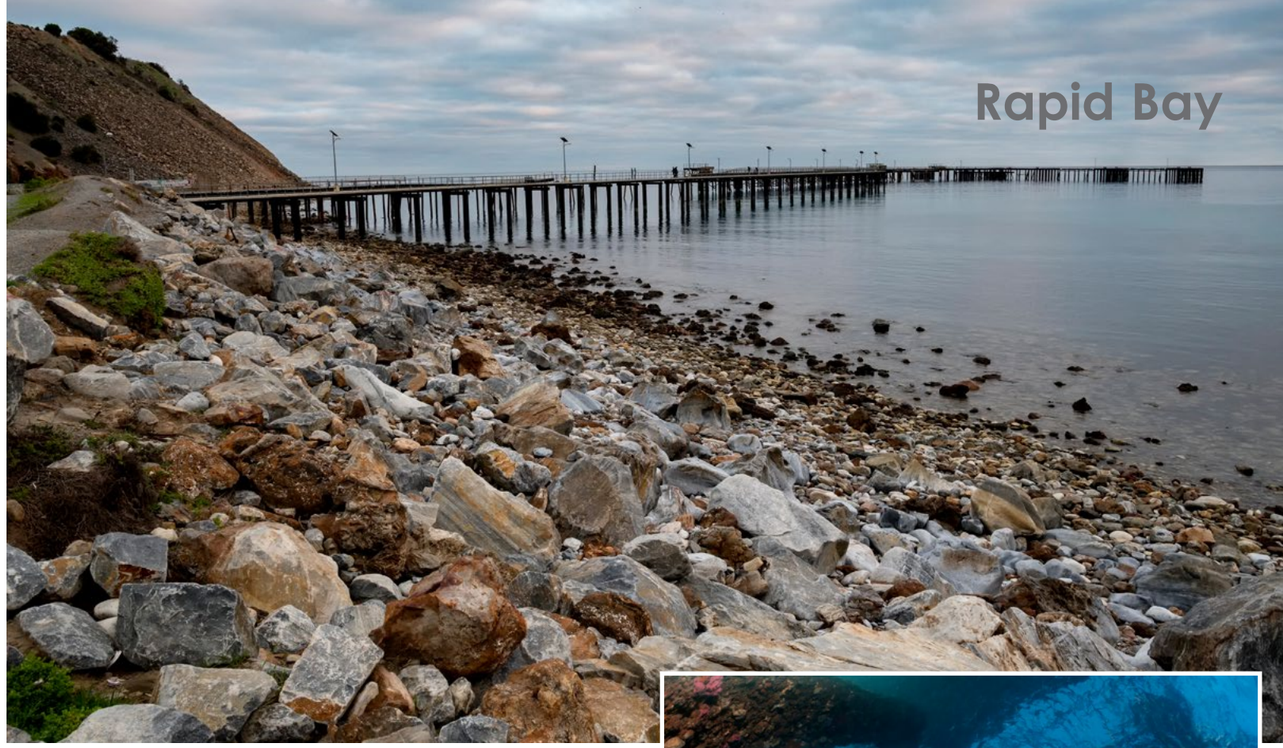
Decorator crab

allowed these pylons to really flourish—just not on the same scale as Edithburgh Jetty. This is principally because of the different structures at the two jetties, with Edithbugh Jetty being quite low and wide, while Rapid Bay Jetty being higher and narrower. At Edithburgh Jetty, colourful filter-feeding ascidians and sponges dominate. But at Rapid Bay Jetty, the hard coral *Culicia sp* is dominant.

Like wrecks, jetties create environments for marine biodiversity to thrive. Their pylons are the catalysts, providing a strong and stable platform for growth to occur.

It is incredibly tempting at Rapid Bay Jetty to look down and forage along the seafloor. But get your buoyancy right and hover around the pylons, and you will see what I mean—with at least 49 species of fish having been recorded at the jetty.

Overall, the activity around the pylons is at its very best out on the Tee, with large schools of old wife fish and zebrafish adding a dynamic element to the towering structures of the six 10m square dolphins, which served as mooring points for ships being loaded.



Rapid Bay Jetty (above); Leafy seadragon at the Tee (left); School of long-finned pike under the Tee (right)

There be Dragons…

Rapid Bay enjoys a strong reputation as one of the most reliable places to encounter the wonderful leafy seadragon (*Phycodurus eques*) of Australia, which one can find soon after entering the water and making one's way over to the old jetty. It is not uncommon to find a "leafy" hanging out around the bottom of the pylons. But the seagrass beds on either side of the jetty often have a leafy or two as well. So, it is worth keeping a lookout for them, but do not go too far off-piste and lose the jetty!

There are rich areas of seagrass out around the Tee, which seem to be the most reliable places to find leafy seadragons, with the area on the outside of the eastern end particularly so. To get there, turn right when you get to the Tee, keep to the left edge of the structure, and head towards the end. Remember to monitor your air consumption, as it is a long way back.

Weedies too

While I have yet to see any myself, I have seen the photographs of divers who have encountered the other Australian seadragon—the less flamboyant, but almost as photogenic weedy seadragon (*Phyllopteryx taeniolatus*) at Rapid Bay.

"Weedies" are harder to find, it seems (certainly for me), indicating that there may be less of them than there are of "leafies"—or that they do not hang out where the leafies do.

Diving Rapid Bay

After gearing up in the carpark comes the test of getting all your gear down the new jetty to the steps at the end, and the jetty is 240m long. One sure way of telling who the local divers are is their trolleys, as the visitors are the hot and sweaty ones hand-carrying their equipment.

While no doubt it is a haul, it is a huge and very welcome improvement, from previously having to scramble in from the shore and then surface swim for 300m, before the new jetty was built. Once in the water from the stairs, it is a 50m swim over to the old jetty. It is a good idea to submerge and familiarise yourself with the "star dropper" posts that show the way between the two jetties, as they will be what you are looking for on the way back.

At the old jetty, you turn right and start the 250m journey out to the Tee, where you have the decision of turning left or right. It is 100m to the end either way, and it is unlikely that you will have enough air to do both and get back to the new jetty.

Possible hazards

Rapid Bay Jetty is not a deep dive, and even right out at the Tee, it is still only about 10m, so decompression time is unlikely to be an issue. But with all that swim-

Southern cowfish under the jetty (above); Eastern blue devil (top left); View under Rapid Bay Jetty (top right)

ming, air consumption will probably be the limiting factor.

There are a few hazards to be aware and wary of, starting with getting disorientated in among all those pylons, particularly at the dog-leg on the way out to the Tee, and then around the three large square dolphins on each side of the Tee. Basically, there are so many pylons, it is easy to get confused and go the wrong way—an issue that can be compounded by possible compass errors induced by all the heavy metal surrounding you.

Secondly, be conscious of the tides at Rapid Bay. You do not want to be caught trying to get back to the new jetty in the middle of an outgoing tide.

Best time to dive, considering the wind

For local divers, the wind is a given, less so for "blow-ins." The basic fact is that some of South Australia's best shore dives are on opposite sides of the St Vincent Gulf, with Rapid Bay being the #1 site on the eastern side, and Edithburgh Jetty the best site on the western side.

The prevailing winds are principally from the south to south-east. So, when it is a good day at Rapid Bay, it is a really bad day at Edithburgh, and vice versa. So, if you are planning to dive Rapid Bay, you really need to check the weather forecast and understand what the wind is doing. Combine the wind information with the tide tables and you have what you need to know.

Logistics

The nearest dive shop is in Adelaide, a couple of hours away. So, you need to arrive at Rapid Bay with everything you need, including snacks and drinks, as there is nothing at the site.

It used to be that if you were spending a couple of days diving Rapid Bay, at some point in time (depending on the number of divers and cylinders involved), a "tank run" would have to be made to Adelaide.

But that changed when local diver Peter Corrigan opened an air-filling station at his home in nearby Second Valley. A new Bauer compressor, complete with storage tanks, means that refills are now quick and easy. Corrigan is reachable through his Facebook page "Second Valley Air Fills" or by phone at: 0499-229-053.

There is a parking area near the jetty, but it is long and narrow. And, because Rapid Bay is such a popular site on weekends, the available parking spots will be taken by early birds, meaning an even longer trek carrying all your gear.

Final words

There are several very good reasons why Rapid Bay is such a popular site. Pretty close to Adelaide, it is a great place to see and photograph leafy seadragons, there are numerous other things to see, and while it is a straightforward dive, it is also very interesting and has a nice touch of adventure too. It gets very busy at the weekends if the wind and tides are good, which means the carpark can get a bit jammed up. But it is such a big site, there is plenty of room underwater. Dive it during the week and you may well have it all to yourself! ■

In more normal times, Don Silcock is based in Bali, Indonesia; however, due to pandemic restrictions, he is currently hunkered down in Sydney, enjoying Australian diving. For extensive location guides, articles and images on some of the best diving locations in the Indo-Pacific region and "big animal" experiences globally, visit his website at: **indopacificimages.com**.

Mexico's Socorro

Sharks, Dolphins, Mantas & More

Text by Kelly LaClaire. Photos by Kate Holt

Close-up of the belly of an oceanic manta ray (above); Diver in the midst of schools of fish and sharks at Roca Partida (previous page)

We leveled off at 25m and the visibility was perfect. I could see my two buddies to my left—Kate adjusting her housing strobes and Dominic turning on his GoPro action camera. A group of silvertip sharks were casually circling a cleaning station, this one manned by bright yellow angelfish. They gave us a glance, but mostly, they were unconcerned. A few whitetip sharks emerged from the drop-off below to join us. More sharks—my favorite.

I was about to give the "Hell, yeah!" sign to my friends when a blaze of movement pulled my attention in the opposite direction. A bottlenose dolphin was hunting a trevally, and it was serious about it. The trevally zigzagged in erratic flashes, trying to outrun its predator, but the dolphin matched it turn for turn. They shot past, twisting in tight circles around us, and I was amazed by the speed of the chase.

Kate pointed behind me, eyes wide. I turned my head and a black manta, slow and graceful, glided towards us. It was a big one, easily four meters across and in no hurry. It wanted a turn with the angelfish at the cleaning station, but our bubbles were irresistible. The manta's giant fins rippled slightly, as it was banking in a wide, leisurely turn. The manta passed through our bubble column, so close I could have easily reached up and touched its belly.

The dolphin shot past us again, still after the panicked trevally. They scared a few of the silvertip sharks, which bolted in all different directions.

This was too much all at once. I honestly did not know what to look at first. My attention was being pulled everywhere simultaneously, and I was afraid I would miss something. I looked at my buddies and they laughed. "Where are we?" their eyes asked. "This is insane!"

The liveaboard

We boarded the nearly 50m-long *Explorer* after sunset and were greeted with champagne and gourmet finger foods. The crew had already taken our gear to the cabins below and were busy casting off mooring lines and preparing the ship for departure. Our divemasters, young and energetic, introduced themselves as they showed us into the spacious, well-appointed salon and galley on the main deck. It was a gorgeous boat, and I knew

Whitetip reef sharks at Roca Partida

Oceanic manta ray at San Benedicto Island (top right); Bottlenose dolphins (top left), humpback whale fluke (center) and mother and calf (left), Lands End off Cabo San Lucas

Socorro

we were going to be extremely happy on it for the next eight days.

Kate, my cousin and photographer, was given a quick tour of the camera stations, and she was visibly enthusiastic, seeing the expansive shelves, lots of plug-ins, room for laptops and tablets, and plenty of towels. The captain gave us all a short briefing, and we soon slipped out of the harbor. The lights of the small city grew dimmer while the stars multiplied and became brighter and brighter. Butterflies filled my stomach. A day at sea and we would be there. Socorro, I could hardly wait.

San Benedicto Island

I was too excited to sleep. It was our first day of diving and I was awake by 5:00 a.m. The sun had just peeked over the horizon—probably too early to expect the crew to be up. I was wrong about that. They had already begun bustling about the stern, filling tanks with nitrox and preparing the two small rubber dive boats that would ferry us back and forth from the *Explorer* to the dive sites.
One of the hostesses had a cup of coffee ready and asked what kind of breakfast I would like once we were back from our first dive as she set out bowls of yogurt, granola, sweet breads and fruit. The butterflies returned, and I made my way to the top deck to watch the sunrise light up San Benedicto Island.

This was the first stop on our eight-day tour through the Revillagigedo Archipelago, often referred to as Socorro, which is one of the main islands in the archipelago. The volcanic islands of Revillagigedo lie roughly 450km southwest of Cabo San Lucas, Mexico, and are heavily protected. Fishing is completely prohibited, and dive time is limited, as are the numbers of boats allowed in the area. But that was exactly what made the diving so fantastic.

Refresher dive

We found this out quickly, as our first dive

Sea lion on the back of fishing boat near the harbor of Cabo San Lucas

El Canyon dive site at San Benedicto Island (above); Diver with oceanic manta ray at El Canyon (right); Oceanic manta (left) and dusky shark (lower right) at the cleaning station at El Canyon

in Revillagigedo was just "bonkers"… There was really no other word for it. It was supposed to be just a short refresher dive off the stern to check one's gear, get one's weights right and familiarize oneself with the currents. In fact, the divemasters even told us not to expect much. However, this was sheer lunacy. The moment we deflated our BCDs, we realized they had vastly undersold the experience.

We had not been under the surface for even ten minutes before we saw three chevron mantas gliding by to inspect our bubbles. Whitetip sharks, cautious but curious, passed by in small groups of two or three, then made way for the larger, more lethal-looking silvertip sharks that cruised by occasionally. In the rare moments when I actually took a good look at the rocks and sandy areas, I spotted enormous slipper lobsters, eels and stingrays.

By the time my tank was low, two more mantas had visited, circling our group and bathing themselves in our bubbles. It was, in a word, "ridiculous." It was perhaps the best dive I had ever had, and this was the warm-up? After the dive, I said as much to Yoav, our first mate and divemaster, who replied, "You just wait. It's going to get even better." He was not lying.

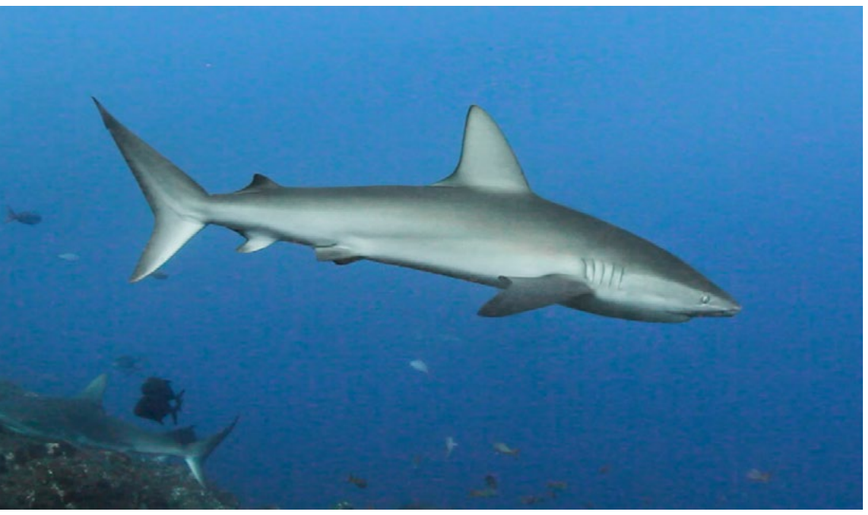
El Canyon—part one

Our first "real dive" was a site called El Canyon, a horseshoe-shaped undersea lava flow, which extended out about half a kilometer from the main body of San Benedicto Island, before dropping off into deep blue water.

The cleaning station at this site sat on a rocky pinnacle at about 30m and was a constant stream of silvertip and whitetip sharks, the occasional large Galapagos shark, and a virtual parade of manta rays. In fact, on our first visit here, we were graced by no less than six of them. The folks at Nautilus like to call them the friendliest mantas in the world, and I do not doubt this is factual. They seem to

actually seek out divers and want to get as close to people as possible, gliding within inches of you in many cases. It was completely exhilarating.

We dove El Canyon three times that day, and these large pelagics made appearances on each dive. In fact, there were so many sharks and mantas, I actually lost count of how many we had seen. And, to be honest with you, dear reader, you really do not have to "dive" the site



Silvertip reef shark at El Canyon off San Benedicto Island (top left); Diver checks out the rocks at The Boiler dive site (top right); Video still of Galapagos shark at El Canyon (left); Diver with spiny lobster at El Canyon (right)

at all; you just find a nice cozy spot along the rocky ridge near the cleaning station, grab on to a handhold and watch. Everything comes right to you. At any time, you can see swarming schools of bigeye jacks, packs of giant bluefin trevally, tiger sharks, bottlenose dolphins—I mean, it is truly endless. This is a "Nat Geo" dive site every time you get in the water. By the end of the day, we were feeling completely spoiled. How was anything going to top that?

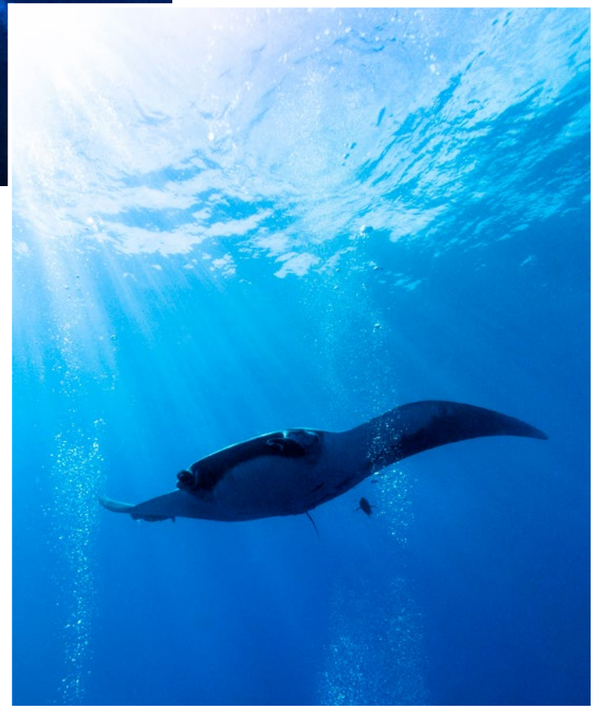
The Boiler

On the far side of San Benedicto Island is the world-famous Boiler dive site—an enormous pinnacle of rock, which shoots up from the deep seabed and almost reaches the surface. The currents swirling around the monolith bring abundant plankton and small fishes, which in turn, bring bigger and bigger animals.

Before we back-rolled off the skiff, which took us out to the dive site from the liveaboard, the divemasters asked us one of the greatest questions ever posed: "Ok, guys, what's our objective? Mantas and whitetips or schooling hammerheads?" Without missing a beat, we all replied in unison, "Hammerheads!"

A few minutes later, we stopped descending at about 30m and started to slowly fin out towards blue water, the huge rock of The Boiler at our backs. Our dive guide pushed on but kept turning his head to make sure we still had it in sight. We kept the pace slow and easy, just like we had been asked to do, as the hammerheads at Revillagigedo were easily spooked and chasing them was not only forbidden, it was counterproductive and completely useless.

A few minutes went by and I still did not see anything except the vast blue. I even caught myself trying to stretch out my neck and squint my eyes, as if that was going to help me spot them. I checked my computer, and when I looked up, our divemaster was pointing ahead with one



Divers approach The Boiler dive site (above); Video still of bottlenose dolphins at The Boiler (top center); Oceanic manta ray hovers over divers' exhaust bubbles (right); Silhouettes of divers and oceanic manta rays at The Boiler (far right)

hand and signaling us to stop swimming with the other. I paused for almost a full minute without seeing anything—the only sound was my breathing. I began thinking it was a false alarm when several ghostly gray figures began to appear in the distance.

At first, I was not even sure what I was seeing. Their bodies were just silver, nebulous shadows without definition or clarity. But as they moved closer, their unmistakable, half–twisting, half–turning swimming pattern became apparent, and the shape of their scalloped heads became clearer and clearer. There were perhaps 30 of them, not tightly bunched, but close enough to maintain their ranks. I had never seen hammerhead sharks before and my heart was pounding, not out of fear or anxiety, but from sheer wonder and overwhelming excitement. They kept their distance, getting no closer than eight or nine meters, but it was close enough, and I mentally checked another item off my diving bucket list.

The hammerhead sharks did not stay long before slowly disappearing back into the vast blue water. Our group stayed motionless for a moment, and then we turned to each other in unison, flashing hand signals, pumping fists up and down, smiling and laughing into our regulators. Our divemaster turned us around, and we swam back to the large, oval-shaped rock of The Boiler. As if to congratulate us, a friendly chevron manta glided by, happy to bathe in our bubbles and get a good look at us.

Do not follow the dolphins

Dolphins in Revillagigedo can sometimes exhibit a bizarre behavior around divers. We were warned about it when we first arrived, but to be honest, I was a bit skeptical until I saw it for myself. Our next dive at The Boiler was a nice, leisurely drift in the current, watching the sharks and mantas passing over the cleaning stations. It was hard to believe just how much life there was around the massive pillar and one could easily get lost in all the action, especially when the dolphins showed up.

This was another first for me. I had seen dolphins dozens of times while on the surface, but up to this point, I had never been lucky enough to actually spend any time with them in the water. We were watching a large school of hun-

Diver with whitetip reef shark at Roca Partida (above); Jack fish (left) and female whitetip reef shark (bottom left) at Roca Partida; Sunset at Roca Partida (right)

dreds of bonito tuna, as they passed by our group, when a small pod of bottlenose dolphins came to investigate.

My heart jumped and I raised my hands in surprise, alerting my buddies and trying to remember what our divemasters had told us on previous briefings. "When you see large pelagic animals here," they instructed, "the best thing you can do is stop swimming. Don't go after them, don't try to get closer, just quit moving and wait patiently. Trust us, more often than not, they will come to you… all you have to do is be still."

Of course, that was easier said than done. As soon as I saw them, I desperately wanted to swim towards them as fast as I could, to get as close as possible. But, thankfully, I, and the rest of our group, resisted that urge, and it paid off. As soon as we stopped moving, they veered towards us, and a trio actually slowed down to get a good look at Kate's camera housing. And here's where it got interesting.

One dolphin came in close, suddenly turned its body towards the surface and stopped swimming. It sat there motionless for just a moment, flippers out, nose straight up, and began to sink. It was a trick, we learned later. The dolphins want you to mimic their behavior, following them down into the dark blue waters below—it was like some kind of bottlenose game of Simon Says.

Apparently, many people have fallen for it and before anyone realizes what is happening, the diver is at 45 or 50m, his or her computer practically melting in decompression freak-out mode. Thankfully, none of us took the bait. But this is your friendly warning: When you visit Revillagigedo, don't follow the dolphins—it's a trap.

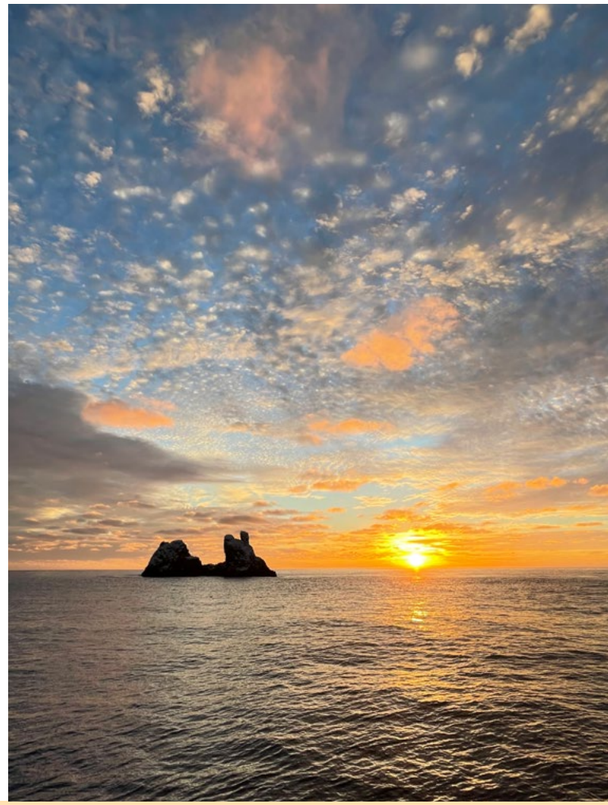
Roca Partida Island

Aboard the liveaboard, we moved on later that night, and the next morning, I was again up before dawn. The hostess, as usual, was ready with hot coffee and continental offerings. I grabbed a scone (I might have taken a cinnamon roll and a danish too, if I am being entirely honest) and went to the top deck to watch the silky sharks circle the boat as the sun rose over the small island of Roca Partida.

I am not much of a morning person in my daily life, but whenever I am diving, the day can never seem to start soon enough. I know it sounds silly and cliché, but I just get so damned excited to get into the water. It brings out the child in me.

Within an hour or so, the rest of the group had joined me, munching on their muffins and sipping their coffees. I could see that same excitement had washed over them as the divemaster gave us the dive briefing for the day. This time, they did not understate it at all.

Roca Partida is a special dive site—possibly the best dive site I have ever



Pregnant whitetip reef shark (above), whitetips sheltering from the current (left) and silvertip shark (lower left) at Roca Partida

visited. This is no hyperbole. I mean it when I say it is truly astounding.

We back-rolled off the little rubber skiff on the lee side of the rock, and quickly dropped to 25m where we were met by scores of razor surgeonfish and massive bluefin tuna patrolling the steep wall. Several enormous spiny lobsters twitched their long antenna at us as we passed, and a pair of silvertip sharks veered around us on their way out into the blue waters.

We continued descending, following our guide, and finned out to catch the current, which swept us toward the first bend in the giant rock. When we rounded the northeastern corner, I could not believe what I was seeing. The water was completely filled with hundreds and hundreds of whitetip sharks. They were everywhere. Above us stretching up to the surface, below us as far as we could see, swarming around us from every direction—there was nowhere to look that was not absolutely teeming with them. My buddies held up their hands and laughed through their regulators. "Look at THIS!"

Even the rocky ledges were full of them. Twenty or thirty at a time were piled up on top of one another— mouths wide open to catch the current. Still more were trying their hardest to squirm their way into the masses of shark bodies in an effort to gain purchase on the rocky ledges, only to slip off the top of the pile and fight again for any available space to rest.

The current did not let us stay long, though, and it swept us around the far side of the rocky pillar where a large tiger shark, shy in these waters, was descending to deeper waters to get away from our party. Several large Galapagos sharks followed wary jacks, keeping tight ranks to our right, and to our left, a small pod of dolphins played near the surface, keeping an eye on the adolescents in their group. I had never seen anything like it. It was an absolutely perfect dive, and I was as happy underwater as I had ever been. I kept glancing at my air gauge, willing it to stay full.

But of course, it soon ran low, and earlier than everyone else's, as usual. Dom, always willing to stay with me, even when his tank still has plenty of air, accompanied me up towards three meters. On our way, a massive school of bonito tuna swam by, their little silver bodies coruscating from the sun breaching the surface. A few more bottlenose dolphins showed up to keep us company. They did not linger, but they made us smile, and we flashed one another the Hawaiian shaka sign.

Sunrise at Roca Partida

Silvertip reef sharks at cleaning station (left), oceanic manta ray (above) and hammerhead shark in the distance (right) at El Canyon dive site off San Benedicto Island

Pregnant whitetip reef shark at Roca Partida

They were followed by curious wahoo fish and two hungry mantas, which swam around us in slow, lazy circles, feeding at the surface. It was one of the best safety stops of my life.

As I said, Roca Partida is special. I encourage you to get there, whatever it takes. You will not regret it.

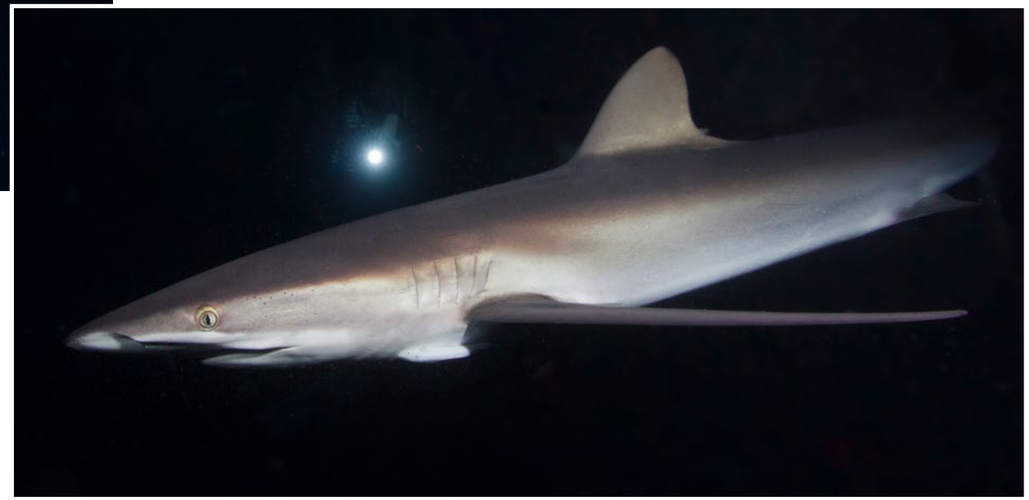
El Canyon—part two

On our last day of diving, we were back at El Canyon, and it did not disappoint. Our group of six was first in the water that morning and, while it was truly magical for me, it also taught me a good lesson. We back-rolled off our skiff and dropped down to 25m, following the rock wall that descended down from the lava flows at the surface. At this point, the ridge dropped off steeply, and beyond it was nothing but endless blue water.

We finned out a little distance, to see if we could get close to the hammerhead sharks again, careful to keep the rocks in sight behind us, lest we lose ourselves with no bearings, and this time, we were able to get right up close and personal. I checked my depth gauge when we stopped swimming and had not yet got my buoyancy right when three scalloped hammerhead sharks emerged from the blue and swam straight towards us.

As I said before, hammerhead sharks are usually cautious here, but no one had been in the water that morning, and I think they were a little surprised to see us so close to their cleaning station. They slowed down to get a good look at us, and swam past us in a long slow descending arch, twisting back and forth, their heads rolling from left to right. We were within three meters of them, so close I could see their pupils clearly, staring and searching. I could see their gills rippling. I could see the teeth of one in sharp detail when it opened its mouth slightly. My heart was racing as they continued their slow, dipping arch. After 30 seconds or so, they began fading into deeper waters and I watched, in a slight trance of wonder, until they were gone, back into the blue.

I turned and raised my fists to my buddies, but they were gone as well. I turned back in the opposite direction, but they were not there either and I felt a tiny flash of anxiety shoot through my stomach. Why was I alone? Finally, I looked up, and there they were, a good distance above me, motioning me to ascend. I had not realized it, but during my close-up encounter with the sharks, I had forgotten my buoyancy and had sunk more than 15m in less than a minute. I looked at my computer and I was dangerously close to going into decompression if I did not get



Underwater photographer with silky shark (above and right) at night at Socorro Island; Oceanic manta ray at Socorro Island (left and top right)

myself into shallower waters in the next few moments.

This can easily happen here, and the divemasters were serious about warning us against it. There is something about large pelagics and seeing them in their natural habitats, especially at close quarters, which can make people completely unaware of anything but the animal in front of them. It happens most with the dolphins, we were told, but as I learned firsthand, it happens frequently with tiger sharks and hammerheads as well.

These are the situations when forgetting your basic diving skills can get you into trouble. Keeping your wits about you is always important when underwater, but when you are diving in places like Revillagigedo, it is an absolute must.

Home again

The last day of any trip to the Revillagigedo Archipelago is spent sailing back to Cabo and reveling in blissful relaxation and gluttony, which you will need after five days of serious diving. I suggest you spend your last few hours soaking in the hot tub at the rear of the second deck, watching the occasional pod of dolphins, looking for whales and sipping hot cocoa with a splash of Baileys, reliving the many amazing moments you experienced. Every aspect of our trip was bliss from top to bottom, start to finish. The food was spectacular, the hospitality was top-notch, and the diving was seriously next-level. ■

Kelly LaClaire is a dive writer based in Portland, Oregon, and his cousin, Kate Holt, is an underwater photographer from the same city. They travel as a team to cover dive locations in the Americas, the Caribbean and the Pacific.

My Most Favorite Location

Contributors' Picks from Around the World

Text and photos by John A. Ares, Larry Cohen, Lureen Ferretti, Anita George-Ares, Frankie Grant, Jennifer Idol, Kate Jonker, Celia Kujala, Matthew Meier, Brandi Mueller, Gary Rose, Michael Rothschild, Don Silcock, Olga Torrey, Ron Watkins and Claudia Weber-Gebert

When we asked our contributors what their most favorite dive location was, they came back with photos and stories of beautiful and exciting spots both near and far from home. From the tropical waters of Papua New Guinea, Indonesia, the Philippines, Chuuk, Mexico's Revillagigedo Islands, Solomon Islands and Cayman Islands, to the subtropical waters off Baha California, Guadalupe Island and the Coronado Islands in Mexico and the eastern coast of Florida in the United States, to the temperate waters off South Africa, the US state of New Jersey, and British Columbia in Canada, to the frigid waters of Alaska, *X-Ray Mag* contributors share their favorite dive locations.

CLAUDIA WEBER-GEBERT

LEFT TO RIGHT: Silversides and sweepers hover over lush soft corals on reef wall; Pygmy seahorse is well camouflaged in soft coral; Prehistoric rock paintings; Divers with whale shark with remoras attached; Wobbegong resting on reef; Liveaboard moored in Triton Bay. PREVIOUS PAGE: Vibrant coral reef and leather corals at Triton Bay in Raja Ampat of West Papua, Indonesia

Triton Bay, Raja Ampat, Indonesia

Text and photos by
Claudia Weber-Gebert

Raja Ampat is well known and beloved by many a diver. One hour's flight south from Sorong leads to Kaimana; this was where my journey to Triton Bay began. The diving area of Triton Bay, south of Raja Ampat, was explored in more detail only about four to five years ago. Only a handful of liveaboard boats go to these dive sites, and there is currently only one resort. Apart from a few local small fishing villages, there is no civilisation.

However, old traces of civilisation can be seen here in the form of over 10,000-year-old prehistoric wall paintings. The captain skilfully steered our vessel, the *Gaia Love*, right up to these places, so that the guests could take pictures of these special prehistoric works of art.

On the coast of West Papua, an upward current brings nutrient-rich water to the surface. The resulting abundance of fish and biodiversity is indescribable. There are so many fish that you cannot see the reef. Enormously large and colourful soft corals make up the basis of these dive areas, starting at a depth of only five metres.

Beautiful hard corals can also be found in completely intact and densely populated reefs, which one can no longer find anywhere else. Fish hide under large table corals, barrel sponges stand like huge planters between the corals, and coral gardens support large areas of black corals. The sight is overwhelming. Although the water is slightly green, the visibility is fine. Underwater photographers will definitely get their money's worth, in both macro and wide-angle shots.

Where the currents pass the steep walls, one can see large, up to 3m-high coral sea fans in every colour and variety. On the sea fans, one can find the much sought-after photo subject: pygmy seahorses, at a depth of only 15m. Most of the time, these little seahorses can only be found from 25 to 30m.

Schools of fish stream by like infinite ribbons through the water, including silversides, snappers, fusiliers, buffalo (or humphead) parrotfish, batfish and barracudas. Mantas and mobula rays also circle over cleaning stations. Of course, small macro subjects can also be found everywhere, such as lots of various colourful nudibranchs, crabs, ornate ghost pipefish, blue-ring octopuses and wunderpus octopuses.

Underwater life rages on, with silversides forming tight swarms, "flying" in formations and giving way to predators, in a skilful spectacle. The swarms are so densely packed that the light dims. The spectacle continues above the water's surface when predators such as dolphins and sailfish, which hunt for smaller prey fish, leap out of the water—these spectacles could even be seen from our vessel. In this case, one could certainly say that pictures really do speak louder than words! The fabulous underwater world here can hardly be described in mere words.

And then there is a very special highlight: whale sharks that come to a *bagan* fishing platform, where local fishermen breed small bait fish. The whale sharks had come here on their own. Nowadays, they are fed to an acceptable level, but only if there are liveaboards on site, i.e., one to two times a week. So, they stay in the vicinity and offer the fishermen an additional source of income, namely the permission from the village elder that the divers may dive under the *bagan* for a fee, with a high probability of encountering the whale sharks. Sometimes, there are up to five whale sharks at a time—from young animals to huge giants. To the extent that feeding is practised here, it is still acceptable.

It is not only the underwater landscapes that inspire, but also the many small floating islands and rocks that reach just out of the water and are covered with lush vegetation. Birds bring seeds from the mainland to the limestone rocks, so abundant vegetation has emerged. Washed under by the water's edge, the rocks seem to float above the sea at low tide, just like the scene in the James Bond film, showing rocky isles in Thailand or Palau.

And of course, the coastal landscape of West Papua also has the same beautiful charms. In the trees, one can see colourful birds, frigatebirds and other water birds circling over the sea, and at night, moths come to the ship, attracted by the light. They are the prey of the bats that flutter around the vessel at night. Ospreys can also be seen in the distance, but they are shy and do not come closer.

I will never forget Triton Bay and its wonders above and below the ocean's surface. ■

Large female great white with pilot fish and small remora (above). Exposure: ISO 100, f/5.0, 1/60s. Gear: Canon 10D camera, Sigma 10-17 zoom lens, Ikelite housing, ambient light; Adult sea lions do taunt the sharks, being more agile (left). Exposure: ISO 100, f/5.0, 1/60s. Gear: Canon 10D camera, Sigma 10-17 zoom lens, Ikelite housing, ambient light; You can get close to the sharks, and they do take test bites on the bars (top right). Exposure: ISO 100, f/5.6, 1/60s. Gear: Canon 10D camera, Sigma 10-17 zoom lens, Ikelite housing, two Ikelite DS-161 strobes

Guadalupe Island, Mexico: Cage Diving with Great White Sharks

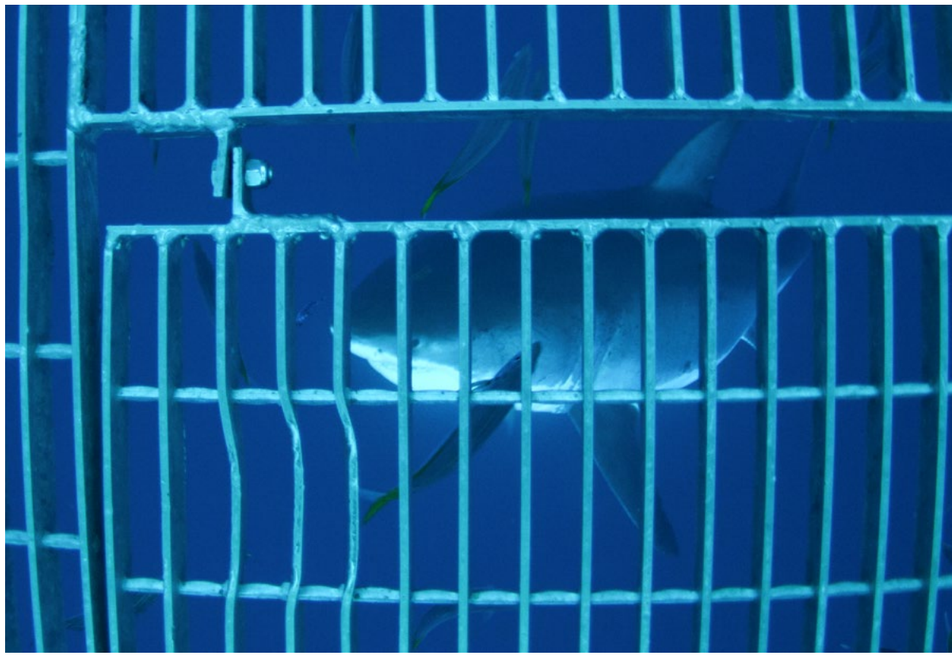
Text and photos by John A. Ares

Guadalupe Island is located off the coast of Baja, Mexico. Diving with the apex predators is a thrill and not scary when you do it inside a cage. I think about this trip almost every day. The dive operator's boat, the *Nautilus Explorer*, was built for the purpose of having four cages in the water at the same time for uncrowded viewing. The cages are about 15ft high and made of two-inch industrial-grade aluminum pipes with 18in openings for cameras.

Up to four divers are allowed in a cage, using surface-supplied air. Scuba tanks equipped with octopus regulators are available in the cages, if needed. Two cages are lowered to a depth of 40ft for 45 minutes per dive. After that, they are winched back up to the surface. Two additional cages remain just below the surface at the stern.

The reason the sharks are here has to do with the tasty sea lion pups that are here in abundance from June to August. Nature gives the pups a test first and they may not get the time to learn how to avoid the sharks as the adults do. Even at the surface, the sea lions keep one eye in the water, scanning below them.

During the trip, we saw seven great white sharks over the course of three days, which were part of a group of around 150 "regulars" that researchers have identified. Scratches, scars and other identifying marks make identifications fairly easy. We saw up to three individuals on one dive. Visit: **johnares.photoshelter.com**



Great white female about to ram our cage from below. Our cage rose about three feet in the water column. Exposure: ISO 100, f/4.5, 1/60s. Gear: Canon 10D camera, Ikelite housing, Sigma 10-17 zoom lens, ambient light

Wolf eels mate for life and have monogamous relationships (above). Exposure: ISO 200, f/4, 1/180s. Gear: Olympus E-620 camera, Olympus 7-14mm lens at 14mm, Olympus housing, dual Sea&Sea strobes; Giant Pacific octopuses are considered the most intelligent invertebrates (top right). Exposure: ISO 250, f/5.6, 1/125s. Gear: Olympus E-620 camera, Olympus 7-14mm lens at 14mm, Olympus housing, dual Sea&Sea strobes; Lingcod can weigh around 59kg (130 lb) (right). Exposure: ISO 400, f/8, 1/180s. Gear: Olympus E-620 camera, Olympus 7-14mm lens at 7mm, Olympus housing, dual Sea&Sea strobes

Vancouver Island, British Columbia, Canada

Text and photos by Larry Cohen

Many scuba divers enjoy going on warm-water trips, but one of my most favorite dive locations is the cold, nutrient-rich waters of British Columbia. The water might be green and cold, but this is an underwater photographer's paradise. I traveled across North America twice to experience the area's magnificent marine life.

The first trip was with John de Boeck's Browning Pass HideAway and the second trip was on the *Nautilus Swell* liveaboard. Both trips were spectacular. Diving double tanks, my dive buddy, Olga Torrey, and I stayed in the water longer than the other divers. The *Swell*'s captain commented that we did not move more than three meters during a one-and-a-half-hour dive. There was always so much to observe and photograph, we did not have to stray far from our entry point.

Wolf eels have always been on my bucket list. They might have a face that only a mother could love, but these gentle fish have a wonderful personality. We spent hours feeding them sea urchins. Seeing a relatively small giant Pacific octopus out in the open during the day was a real treat.

At the end of our trip on the *Nautilus Swell*, the captain said we could do one last dive in Port Hardy. He told us that it would be a dark dive, and the visibility would be limited. He said we should see some big lingcod. Jumping in the water, we realized the captain was correct.

Even during the day, it was so dark it felt like a spooky night dive. As we explored the area, we saw a lingcod so huge, it scared us! When the captain said big, we did not know he meant gigantic! This was the perfect ending to another great dive trip to British Columbia.

We cannot wait until we could go back to explore the rich underwater environment of western Canada. Visit: **liquidimagesuw.com**

Diverse species are at Blue Heron Bridge in Riviera Beach in Florida, USA. CLOCKWISE FROM TOP LEFT: Seahorses mating; Striped bumblebee shrimp; Arrow crabs molting; Octopus mother with brood of eggs; Pair of seahorses in mating ritual; Crab devouring another crab—hopefully, not a relative; It takes a village—two male frogfish lift a female frogfish to spawn.

Blue Heron Bridge, Riviera Beach, Florida, USA

Text and photos by Lureen Ferretti

Considering the number of favorite dives sites I have, determining an ultimate favorite was difficult. So, I based my decision on the number of great photos and memorable experiences I have had at a single site. This would place the world-renowned Blue Heron Bridge in Riviera Beach, Florida, at the top of my list.

If you are unfamiliar with the type of diving at the site, it is referred to as muck diving. There is a shallow, sandy bottom, with little to no natural coral, gorgonians or marine vegetation. It is located in the Intracoastal, a body of water that lies between the mainland of southeastern Florida and a thin barrier island to the east of the mainland. The ocean water is refreshed with each high tide, which brings with it a multitude of cryptic critters from the Gulf Stream current. The best time to dive is generally an hour before high tide to an hour after high tide, but with good air consumption and knowledge of the terrain, you can extend your dive time.

Why is it my favorite? It is just a 45-minute drive from my home, and the price is right—just the cost of an air fill, allowing me to dive there frequently. At Blue Heron Bridge, I have learned so much about marine life behavior, camera settings, strobe positioning, proper dive etiquette and good buoyancy skills... this dive site is a treasure.

Having dived here so often, I learned about the life cycles of many marine species and witnessed incredible behaviors. For example, striped bumblebee shrimp are most often seen when the water temperature is a bit "colder" during the winter months, and are most often found on purple short spine pincushion sea urchins.

Seahorses have a glorious mating ritual. They hold tails and swim together, and they move in a way that appears as if they are singing, but I suspect this is a process in which they hydrate themselves before mating, and the male bends over repeatedly to open his brood pouch before the mating pair lift off into the water column. Having witnessed their ritual on three separate occasions, I know what is going to happen when I see that behavior and so the waiting game begins. I dive as often as possible and watch from a distance so that I do not disrupt them, and if I am lucky, I will capture the moment the female deposits her eggs into her mate's pouch (yes, it is the male that carries the babies).

I have also seen frogfish spawning several times, lancer dragonets spawning, predation (crabs are brutal), a multitude of cleaning stations, arrowhead crabs molting, and over the course of a couple of months, I tracked the progress of a new mother octopus from the day she first laid her eggs, after which she looked drained and unaware, to the day the eggs hatched.

These are only some of the amazing experiences I have had, diving at my local watering hole, but there have been many, many more. Visit: **DeepWaterPics.com**

Two warty frogfish with a black Randall's frogfish (above). Exposure: ISO 200, f/11, 1/200s. Gear: Canon EOS Digital Rebel XTi camera, EF 50mm f/2.5 compact macro lens, Ikelite housing, two Ikelite DS161 strobes; Many-toothed garden eel in seagrass bed (left). Exposure: ISO 200, f/8, 1/200s. Gear: Canon EOS Rebel SL1 camera, EF-S60mm f/2.8 macro USM lens, Ikelite housing, two Ikelite DS161 strobes

Thorny seahorses clinging to a sponge (above). Exposure: ISO 200, f/11, 1/160s. Gear: Canon EOS Rebel SL1 camera, EF-S60mm f/2.8 macro USM lens, Ikelite housing, two Ikelite DS161 strobes; Adult striped catfish hiding under a coral overhang (left). Exposure: ISO 100, f/11, 1/200s. Gear: Canon EOS Rebel SL1 camera, EF-S60mm f/2.8 macro USM lens, Ikelite housing, two Ikelite DS161 strobes

Dumaguete, Philippines

Text and photos by Anita George-Ares

The Dauin coast, a diving mecca often referred to as Dumaguete, is located on Negros Island in the Philippines. My husband, John, and I made five dive trips to Dumaguete. We are looking forward to diving there again. On every trip to Dumaguete, we see marine species that we have never seen before. Dumaguete's wonderful marine biodiversity is due to its diverse habitats.

Although Dumaguete is known for its muck diving, it is more than a muck-diving destination. Scattered coral heads and sloping reefs provide great photographic opportunities. At different dive sites, there are different species depending on the bottom characteristics (coarse sand, silt, coral rubble or sea grass). In addition to photographing the numerous fish and invertebrate species, it is not unusual to see a green sea turtle or a turtle-headed sea snake. For those who love octopuses, I have photographed six different octopus species here, in addition to one octopus species that I have not yet identified. The many-toothed garden eel shown in the photo is one of three garden eel species I have photographed at Dumaguete. Two of the four frogfish species I photographed here are also shown.

Dumaguete's dive sites are located within ten marine protected areas. There are a few, small artificial reefs made of tires or wooden boats. These artificial reefs have a good diversity of photo-worthy marine creatures. For those wanting to explore other dive sites, day trips are available to Apo and Siquijor Islands and to Oslob's whale sharks.

Please visit my Facebook page at: **facebook.com/profile.php?id=100016947967639**

Gear used for all images: Canon 7d Mark II camera, Tokina 10-17mm fisheye lens, Sea&Sea housing, dual YS-D2 strobes. Underwater scene at Land's End, Baja California Sur, Mexico (above). Exposure: ISO 100, f/8, 1/125s, ambient light only; Sea lion exhaling bubbles (right). Exposure: ISO 200, f/7.1, 1/250s; Huge bait ball (top right). Exposure: ISO 200, f/7.1, 1/250s

Land's End, Baja California Sur, Mexico

Text and photos by Frankie Grant

Positioned as the last dive site on the Baja Peninsula in Mexico, Land's End hosts an ever-changing variety of creatures big and small. As prevailing currents change with the seasons, divers have chance encounters with whales, schooling mantas, bait balls, whale sharks, and more. If this is not enough, Land's End also boasts an active sea lion colony and a small shipwreck! This is a place so special and unique, every single dive will present new excitement.

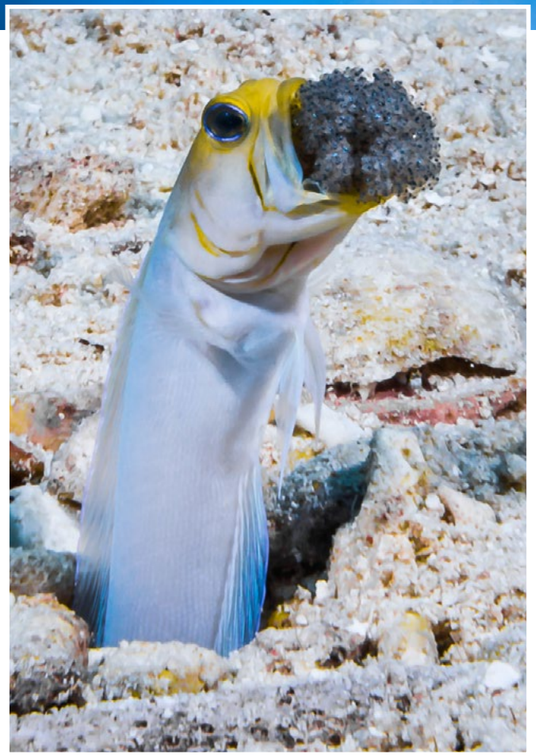
During the change from summer to fall, schooling fish looking for protection swarm the rocks around Land's End, leading to countless sea lions hunting together in this area. I have spent many dives simply content enough to sit on the sand and watch these sea lions bob and weave through the bait ball. Still, the most memorable experience would have to be witnessing a "heat run" of humpback whales zoom by the pinnacle as my clients and I looked on with amazement of the sheer size of these animals.

This site should be at the top of any ocean enthusiast's bucket list for its ease of access, unique animal encounters as well as the other animal encounters one can link together into one amazing vacation. Look no further than Cabo San Lucas and Land's End! Visit: **frankiegrant.com**

Location

Gear used for all images: Nikon D610 camera, Nikkor 14-24mm lens, Nauticam housing

A panoramic view of the USS *Kittiwake* shows the ship's layout. Exposure: ISO 640, 14mm, f/11, 1/60s



A male yellowhead jawfish aerates eggs. Exposure: ISO 400, 24mm, f/9, 1/200

Groupers can be seen looking for wrasse on the reefs to help clean their mouths (right). Exposure: ISO 400, 24mm, f/9.0, 1/200s

Grand Cayman, Cayman Islands

Text and photos by Jennifer Idol

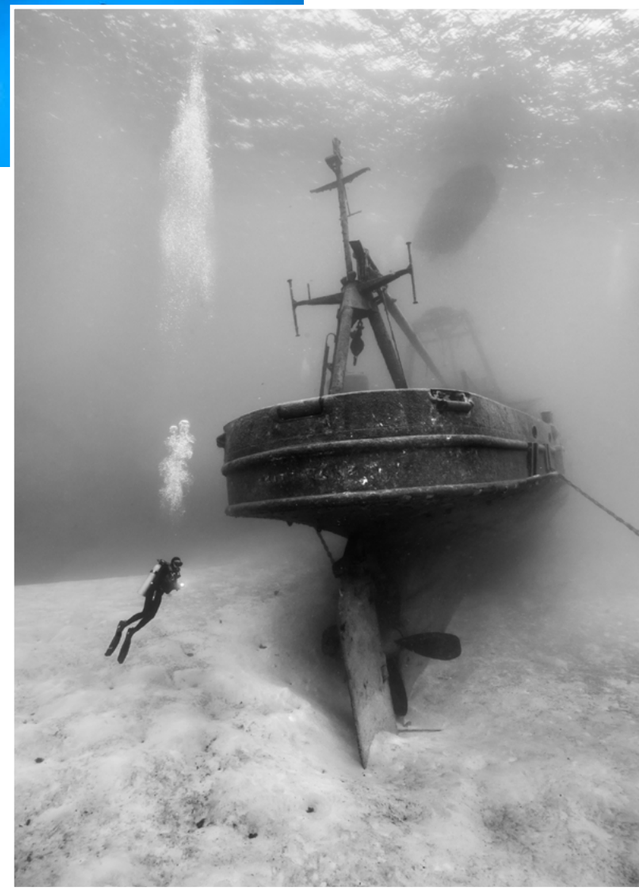
Although the "next dive" is always "my favorite," few destinations stand out as remarkable experiences. Of my dives, those at Grand Cayman have had the greatest influence over my photography. Cathy Church's Photo Centre is a pillar of photography, which has attracted world-class photographers for decades, including Cathy herself and the photographers I had the joy of diving with during a once-in-a-lifetime photo workshop.

While my experiences with Grand Cayman are personal, the opportunities for anyone to experience the delights offered here are plentiful. From the still remarkable USS *Kittiwake* to Devil's Grotto and stingrays, subjects abound. A hurricane transformed the USS *Kittiwake* in 2011 but also added the nearby reef as a subject by proximity.

The people we dive with enrich our dives beyond the environment we immerse ourselves into, which is why this often-photographed region has left such an indelible impression on me. Diving is easy with good visibility and limited current, so all attention can be given to buddies and photography.

Macro life abounds in shallow reefs, particularly from the Sunset House area. From secretary blennies to yellowhead jawfish and garden eels, unique animal behavior can be observed with ease.

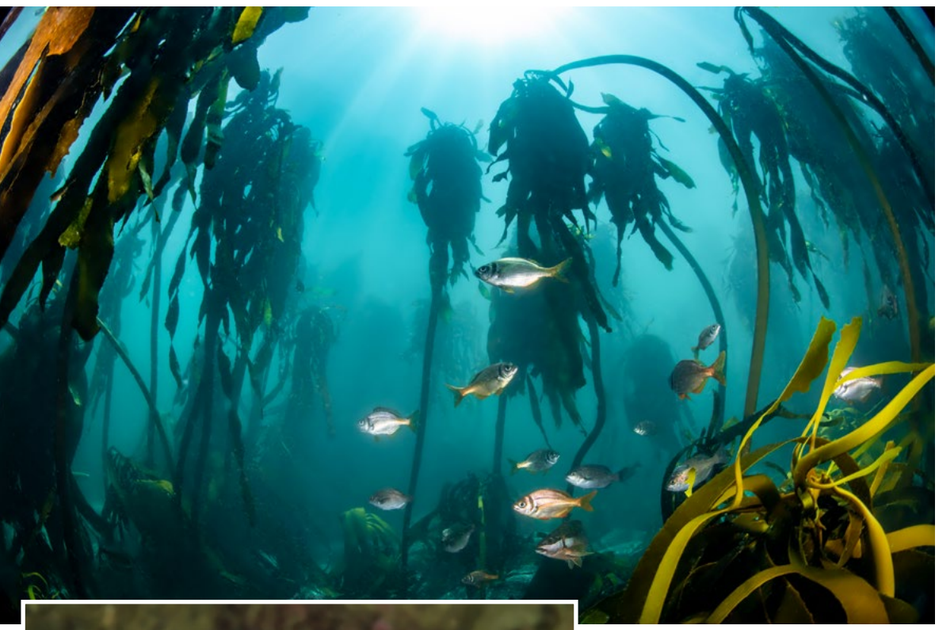
Ever since the Covid-19 pandemic changed the world, more wildlife has returned to Grand Cayman, making this a highly desirable destination. Shore diving is widely available, and more accessible than boats, until tourism returns to full capacity. Visit: **uwDesigner.com**



Before the hurricane, the USS *Kittiwake* sat upright, with an exposed propellor. Exposure: ISO 400, 18mm, f/11, 1/100s

Location

Beautiful False Bay coastline, where the mountains reach the sea (above). Photo taken with a Samsung S10 smartphone; Gasflame nudibranch at Whittle Rock dive site in Simon's Town, western side of False Bay (left). Exposure: ISO 320, f/14, 1/40s; The pristine and plunging reefs of Steenbras Deep, Gordon's Bay, on the eastern side of False Bay (below). Exposure: ISO 320, f/16, 1/80s; Leopard catshark at Drop Zone dive site in Gordon's Bay, eastern side of False Bay (top left column). Exposure: ISO 320, f/14, 1/30s; The great African kelp forest at Blousteen, eastern side of False Bay (middle left column). Exposure: ISO 160, f/13, 1/200s; Portrait of a resting pyjama shark (bottom left column). Exposure: ISO 160, f/25, 1/250s. Gear used for all underwater images: Nikon D850 camera, Nikkor 8-15mm fisheye lens, Isotta housing, two Inon Z240 strobes, Orcatorch D900V for focus light



False Bay, Cape Town, South Africa

Text and photos by Kate Jonker

They say that home is where the heart is. My home is False Bay, with its swaying great African kelp forests and pristine reefs filled with vibrant and fascinating marine life. It is here, in False Bay, that the Oscar-winning, heart-warming, heart-wrenching tale of a man's friendship with an octopus took place. It is magical here.

False Bay is situated on the southwestern tip of Africa, where the sprawling metropolis of southern Cape Town and the lush vineyards of the Cape meet the ocean. The beauty above the water is reflected beneath the waves, where the mountains dip their toes into the sea and give way to underwater wonderlands.

There are shallow reefs that slope gently into the Bay, glittering kelp forests that line the coast, pristine deeper reefs, and wrecks. Whales roam False Bay throughout the year. Resident Bryde's whales follow the bait fish, and in October and November, Southern right whales make False Bay their safe refuge. Dolphins, often in their hundreds, can be seen chasing the larger schools of sardines and this, in turn, attracts the orcas.

False Bay is a playground for Cape fur seals that laze on the surface, often swooping down and barking playfully at unsuspecting divers. Small reef fish such as blennies, triplefin and klipfish perch on the marine-lush pinnacles, whilst dozens of jewel-like nudibranchs graze their way across dense pastures of soft corals, sponges, bryozoans and hydroids. Beautiful basket stars, clinging to the many sea fans, wave their outstretched arms to-and-fro in the gentle surge, grasping at tiny particles of food in the water column.

Small sharks such as puffadder and dark shysharks loll lazily on bouncy yellow sponges, and the larger pyjama and leopard catsharks patrol the reefs in search of a snack. Inquisitive short-tail stingrays, gully sharks and sevengill cow sharks can also be encountered in the kelp forests.

False Bay has it all! No matter where I travel, it is the kelp forests and reefs of False Bay that call me back; this is my home, and where my heart belongs.
Visit: **katejonker.com**

Sea lion pup (top left). Exposure: ISO 400, f/11, 1/250s; Sunburst (above). Exposure: ISO 250, f/11, 1/250s; Sea lion playtime (right). Exposure: ISO 250, f/11, 1/250s; Seaweed toy (left). Exposure: ISO 400, f/11, 1/250s. Gear used for all images: Nikon D500 camera, Tokina 10-17mm fisheye lens, Nauticam NA-D500 housing, dual Sea&Sea YS-D3 strobes

Coronado Islands, Baja California, Mexico

Text and photos by Celia Kujala

Diving with sea lions is one of the most fun and magical experiences a diver can have underwater. One of my favorite places to dive with them is the Coronado Islands, a small group of islands off the northwestern coast of Baja California, Mexico, accessible by a day trip from San Diego, California.

The best dive site for interactions is Lobster Shack on the North Island where the California sea lion rookery is located. It was there that I first went diving after I bought an underwater housing for my DSLR camera. It is a location that keeps drawing me back.

California sea lions give birth to their pups in early summer. As summer comes to an end, the pups have matured enough and start venturing farther away from the shore. Each day, they gain more and more confidence, exploring their underwater world.

They are extremely adorable and curious. Play is a very important part of their development and everything in the ocean is a potential toy. They enjoy playing with each other, seaweed, rocks, starfish, sticks, feathers and even divers!

Observing the individuals in this rookery has taught me so much about sea lions and underwater photography. I am forever grateful for each moment. When the time comes for me to leave their underwater paradise, I start dreaming of the next time I can slip back into their world. Visit: **sealpeace.com**

A shallow coral reef encircles this small island just offshore of the main island of Tulagi, Tulagi Switzer Island, Florida Islands (above). Exposure: ISO 200, f/8, 1/250s. Gear: Nikon D810 camera, Nikon 24-70mm lens; An F4U Corsair fighter plane, resting upright on the sandy sea floor, nearly fully intact except for its propeller, at Munda (top left). Exposure: ISO 1600, f/6.3, 1/60s. Gear: Nikon D810 camera, Nikon 17-35mm lens, Subal housing; Head-on view of a crocodile flathead fish laying on the sandy bottom, Marovo Lagoon (center). Exposure: ISO 200, f/20, 1/200s. Gear: Nikon D810 camera, Nikon 105mm macro lens, Subal housing, Sea&Sea YS-250 strobes with snoots

Solomon Islands

Text and photos by Matthew Meier

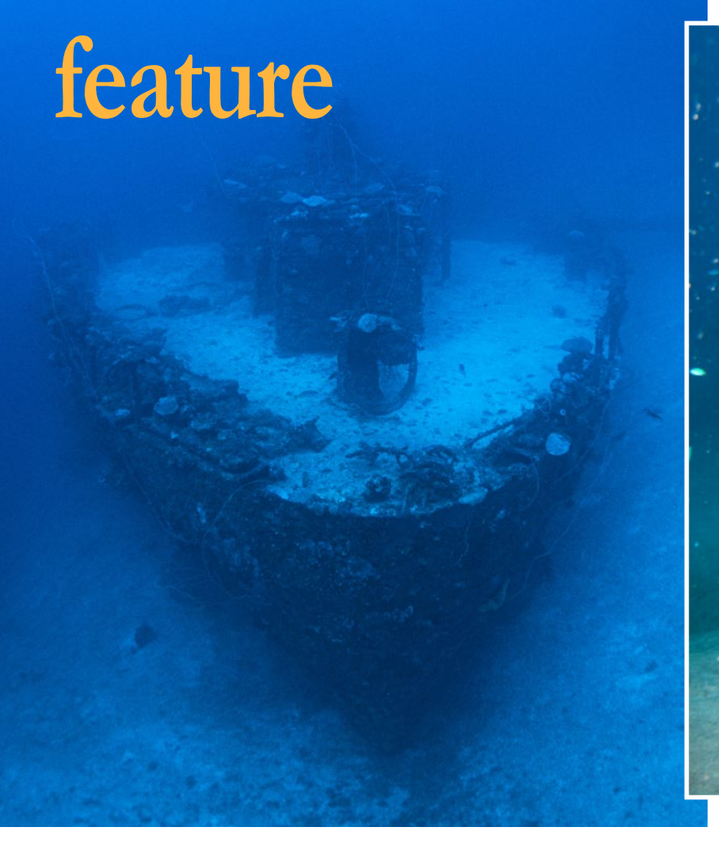
I cannot honestly say that I have only one single favorite dive destination, as I have been fortunate to experience dozens of incredible dive adventures around the globe. However, my most recent addition to the "I-cannot-wait-to-get-back-there" list is the Solomon Islands. This remote chain of tropical islands off the eastern edge of Papua New Guinea offers seemingly exclusive access to pristine, rarely visited coral reef systems, magnificent and massive sea fans and plate corals, spectacular underwater caverns, abundant sea life and a wide assortment of World War II wrecks, both above and below the surface.

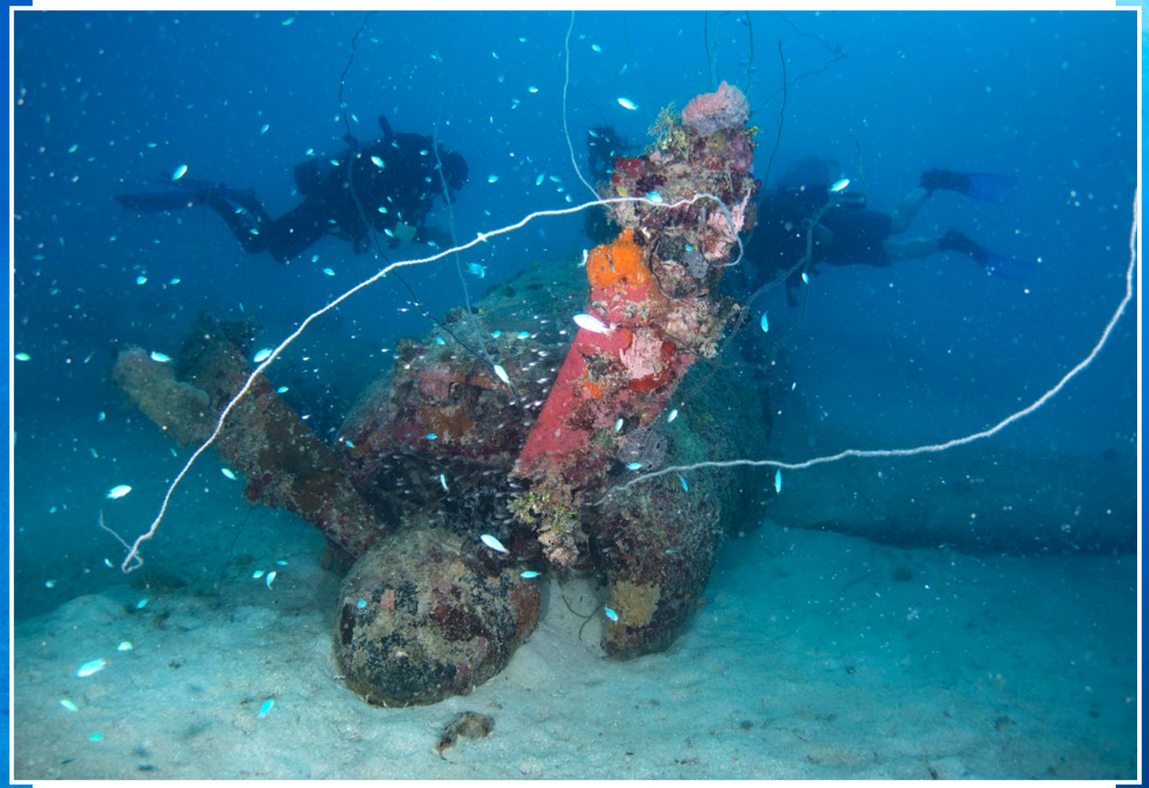
Numerous land-based dive operations, with an array of accommodation options, exist on several islands, plus two liveaboard dive boats offer varying itineraries to transport divers to the otherwise inaccessible corners of the Solomon's over 900 islands.

My fascination with WWII history in the Pacific added special meaning to touching down on the capital island of Guadalcanal and to observing where John F. Kennedy was stationed before being shipwrecked in his PT-109. I was also privileged to dive on a newly discovered Corsair fighter plane near the town of Munda, which was nearly fully intact 75 years after crashing into the sea.

Bring your sense of adventure, as things are still a bit rustic, but the locals are lovely and inviting, the diving is phenomenal, and the scenery is out of this world. Save space in your luggage for some of the planet's best woodcarvings and do not miss the fresh squeezed bush-lime juice. You can thank me later. Visit: **MatthewMeierPhoto.com**

A scuba diver hovering behind a massive red sea fan on a wall, Russell Islands (above). Exposure: ISO 200, f/5.6, 1/30s. Gear: Nikon D810 camera, Sigma 15mm fisheye lens, Subal housing, Sea&Sea YS-250 strobes; An aggregation of reef fish swimming above hard and soft corals in a shallow coral garden, Marovo Lagoon (top right). Exposure: ISO 200, f/5.6, 1/80s. Gear: Nikon D810 camera, Sigma 15mm fisheye lens, Subal housing, Sea&Sea YS-250 strobes





Shotan Maru stern (top left). Exposure: ISO 500, f/5.6, 1/100s. Gear: Nikon D850 camera, Ikelite housing, dual Ikelite DS161 strobes; Jill airplane (above). Exposure: ISO 400, f/8, 1/125s. Gear: Nikon D850 camera, Ikelite housing, dual Ikelite DS161 strobes; Colorful marine life decorating the wrecks (right). Exposure: ISO 320, f/11, 1/100s. Gear: Nikon D850 camera, Ikelite housing, dual Ikelite DS161 strobes; *Fujikawa Maru* from the surface (bottom right). Exposure: ISO 500, f/5.6, 1/200s. Gear: Nikon D850 camera

Artifacts, bowls and a record, which was most likely propaganda. Exposure: ISO 250, f/10, 1/100s. Gear: Nikon D850 camera, Ikelite housing, dual Ikelite DS161 strobes

Truk Lagoon, Chuuk, Federated States of Micronesia (FSM)

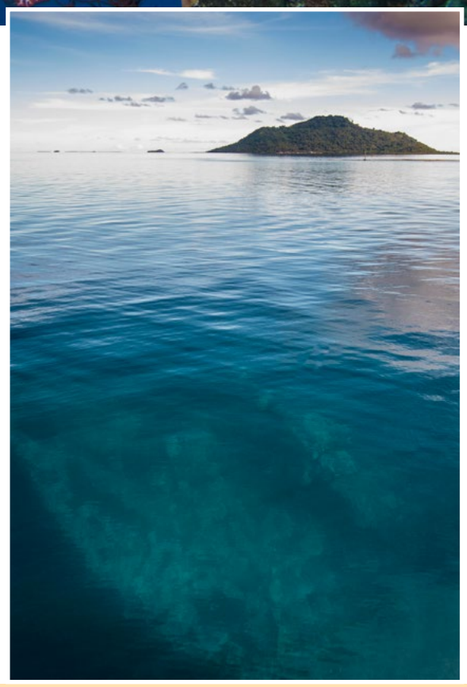
Text and photos by Brandi Mueller

I love diving no matter where I am, but I really love wreck diving because of the history involved. I find nothing more exciting than to be able to literally dive into history and see a ship or plane, knowing the stories of how it got there. Truk Lagoon, now known as Chuuk Lagoon, is one of the world's most famous wreck diving locations, where more than 50 vessels were sunk in one battle during WWII.

The Americans launched Operation Hailstone on 17 and 18 February 1944, and blindsided the important Japanese base, leaving an entire museum underwater for divers to explore. Even better, the tropical waters of Micronesia in the Pacific Ocean have turned the wrecks into living memorials with colorful soft coral draped like wreaths and fish life swarming the ships.

The types of wrecks here include luxury cruise liners requisitioned by the Imperial Japanese Navy, merchant ships, two destroyers, a submarine, airplanes, a tugboat and more, with the largest over 500ft long. The Federated States of Micronesia made salvaging the wrecks illegal early on, preventing looters from taking home artifacts, which means many items are still intact and inside the ships for divers to see. Elegant china, rubber soles of shoes, gas masks, beer and sake bottles, sinks and toilets are just some of what can be seen. There are also Long Lance torpedoes, massive shells, landmines, and literally piles of bullets, among other ammunitions.

Divers can still penetrate the ships to view engine rooms, galleys, bathrooms and crew quarters. Amid the history behind the wrecks, the artifacts you can see, and the lovely marine life that has made the wrecks their home, there is something for everyone at Truk Lagoon. Please visit: **brandiunderwater.com**



Giant black manta, San Benedicto (above). Exposure: ISO 200, f/8, 13mm, 1/125s; Socorro Island (left). Exposure: ISO 200, f/16, 12mm, 1/125s; Giant chevron manta (right), San Benedicto. Exposure: ISO 200, f/11, 17mm, 1/100s; Whitetip sharks in "cavelet," Roca Partida (top right). Exposure: ISO 200, f/11, 17mm, 1/125s. All photos were taken with a Nikon D500 camera, Tokina 10-17 lens, Nauticam housing, Inon Z330 strobes

Diver with whitetip shark, Roca Partida. Exposure: ISO 200, f/8, 12mm, 1/100s

Revillagigedo Archipelago, Mexico

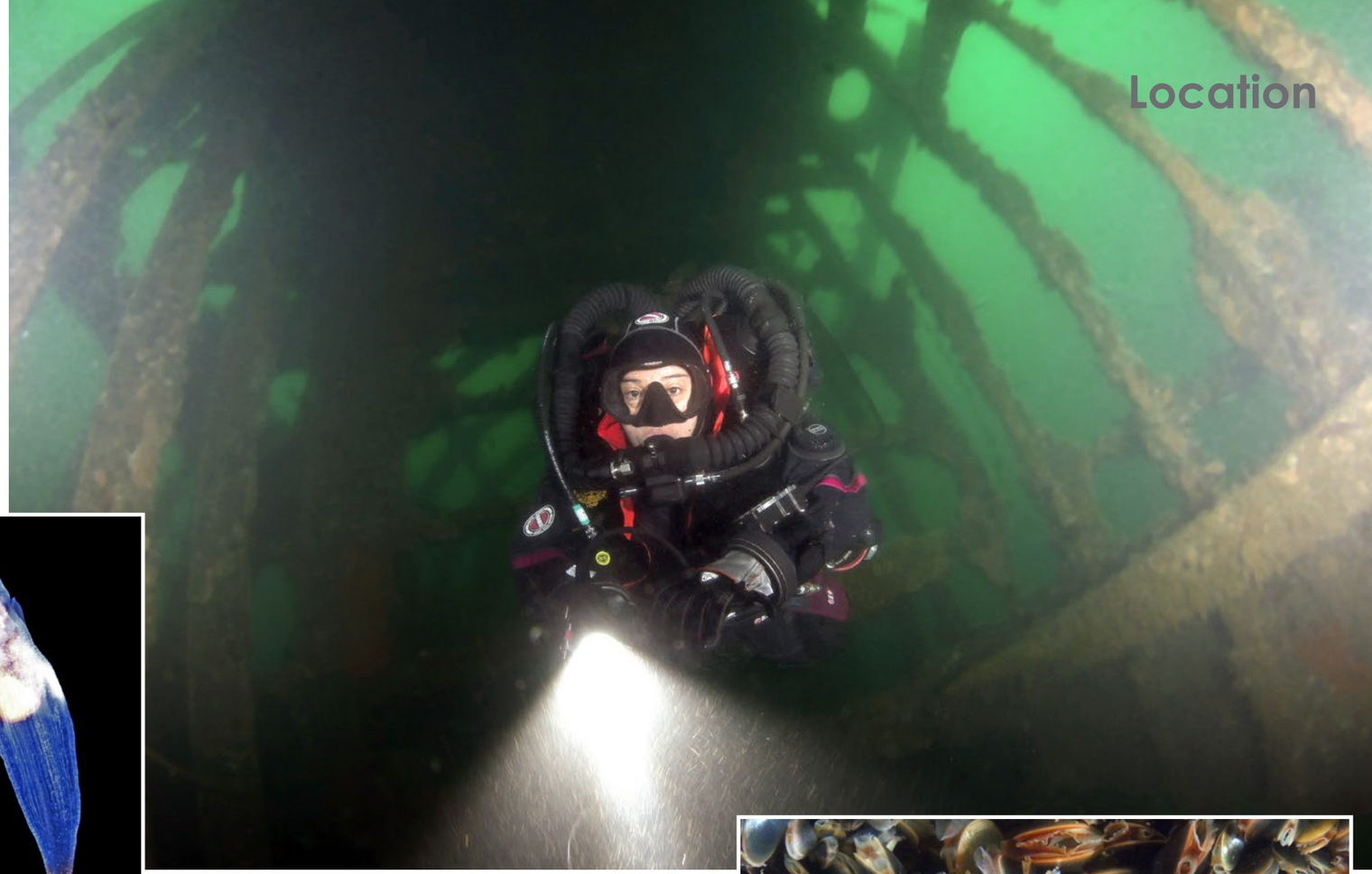
Text and photos by Gary Rose, MD

Pinnacles reaching up from the benthic Pacific floor a mile below, lava flows extending like rivers into the deep azure of the sea—and without human presence—synergistically create one of the most remote and beautiful dive locations on Planet Earth. The islands of the Revillagigedo Archipelago are located 300 miles from Cabo San Lucas, Mexico. Deep azure water, strong nutritive currents, and open ocean collaborate to create the perfect environment for grey whales, whale sharks, giant mantas, hammerhead sharks, whitetip sharks, Galapagos sharks, porpoises and seals.

At Socorro Island, giant mantas, with wingspans of up to 21ft, regularly swim up to patiently waiting divers. They dance, swirl, loop, pirouette and plunge to the rhythm of the sea. When they come up close, their cognitive eyes penetrate one's thoughts, and you become as one.

Roca Partida Island is 300ft long and plunges vertically to the ocean floor, miles below. It is a prolific aquarium of pelagic diversity. Unique to Roca are the shallow "cavelets" that pockmark this vertical and sheer drop-off, each containing uniquely packed whitetip sharks within, which live symbiotically with lobsters and moray eels. If you approach very slowly, from below, you will be able to photographically capture this amazing natural phenomenon.

One can only get to Revillagigedo by liveaboard. I traveled with Nautilus Liveaboards on the *Undersea*. In addition to the amazing comfort, scrumptious dining around the clock, four dives per day with a fabulous crew, it was a photographer's dream, complete with individual work and charging stations. Revillagigedo is my favorite dive site, and I am already planning my next photographic dream trip. Visit: **garyrosephotos.com**



Dive buddy on the *Great Isaac* wreck. Exposure: ISO 400, f/11, 1/8s. Gear: Canon EOS 7D Mark II camera, Nauticam housing, Tokina 10-17 fisheye (10 mm) lens, dual Inon Z-330 strobes

Dive buddy on the *Pinta* wreck (above). Exposure: ISO 1000, f/11, 1/6s. Gear: Canon EOS 7D Mark II camera, Nauticam housing, Tokina 10-17 fisheye (10 mm) lens, dual Inon Z-330 strobes; Dive buddy on the *Stolt Dagali* wreck (top left). Exposure: ISO 500, f/10, 1/100s. Gear: Canon EOS 7D camera, Tokina 10-17 fisheye (13 mm) lens, Nauticam housing, dual Inon Z-330 strobes; Sea angel (center). Exposure: ISO 200, f/10, 1/160s. Gear: Canon EOS 7D Mark II camera, Nauticam housing, Tamron 60mm macro, dual Inon Z-330 strobes; Mollusks on a shore dive in the Shark River Inlet, Belmar, New Jersey (right). Exposure: ISO 4000, f/14, 1/100s. Gear: Canon EOS 7D Mark II camera, Nauticam housing, Tamron 60mm macro, dual Inon Z-330 strobes

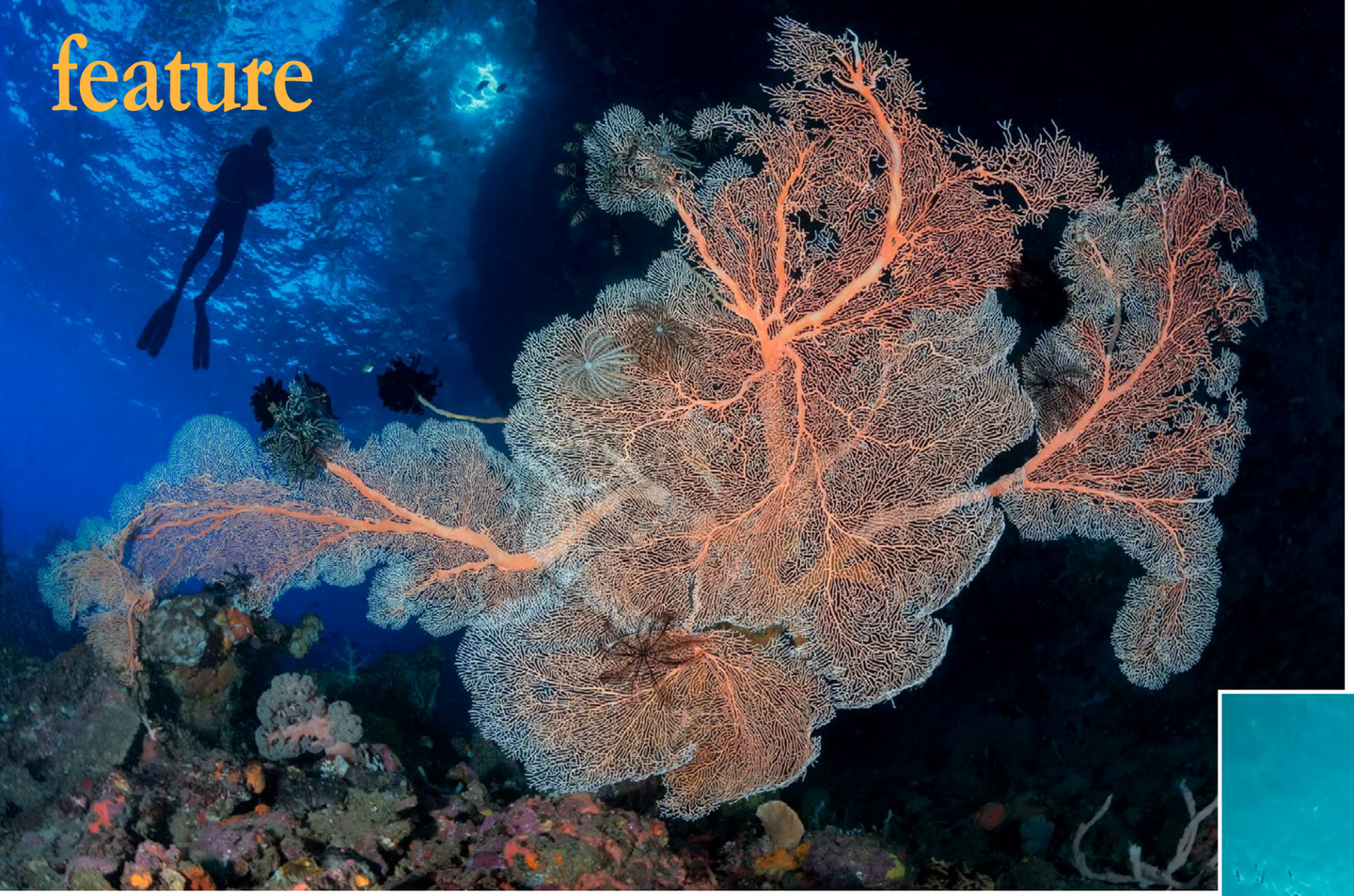
New Jersey Shore, USA

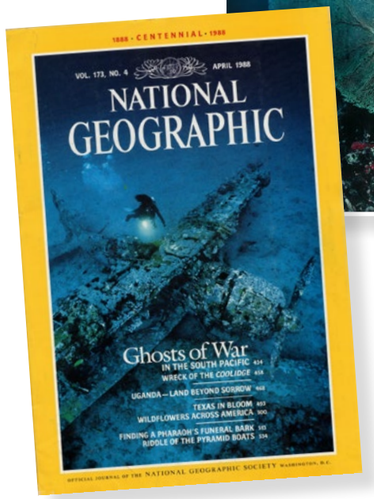
Text and photos by
Michael Rothschild, MD

I have been to Truk Lagoon, Bonaire, and a number of other exotic dive locations, but my favorite dive location is just an hour's drive from my home in New York City—the New Jersey Shore. One of the reasons why I love the dives here is that I can go every weekend. There is no need for time off from work, air travel or hotels, and no camera and dive-gear luggage problems. But it is not just that. There is world-class cold-water diving here, much of it accessible to recreational divers.

Folks here live on the edge of a vibrant marine ecosystem. I have seen a spectacular range of sea life, from tiny, beautiful nudibranchs to a humpback whale, which swam past me last season while I was on the deco line.

In addition to critters, the seafloor off the coast has hundreds of diveable shipwrecks. This is because New York has been a major shipping hub for 500 years, and because the relatively shallow continental shelf extends far out to sea, into the New York Bight. While some wreck dives at dive destinations are artificial reefs, most of those off the New Jersey Shore are "real" wrecks, each with a fascinating and often tragic history. For example, during WWII, U-boats prowled these shores, sending scores of ships to the bottom. You can dive these historic sites today, as well as several of the submarines that sank them. Visit: **seagypsies.nyc/imaging/**





The author was inspired to visit Deacon's Reef by David Doubilet's photos (above and right) in his article on Papua New Guinea in the April 1988 issue of *National Geographic* with a cover shot by Doubilet of an aircraft wreck in Papua New Guinea, shown at left.

Diver with huge sea fan (above). Exposure: ISO 200, f/16, 1/100s. Gear: Nikon D300 camera, Tokina 10-17mm lens, Subal housing, dual Ikelite DS160 strobes; Sea fan on reef, with outrigger canoe in silhouette in the background (right). Exposure: ISO 320, f/8, 1/250s. Gear: Nikon D500 camera, Nikon 8-15mm lens, Nauticam housing, dual Ikelite DS160 strobes

Deacon's Reef, Milne Bay, Papua New Guinea

Text and photos by Don Silcock

My all-time personal favourite dive location is Deacon's Reef on the northern coast of Milne Bay. Why? Well, because it was the inspiration for my long-term fascination with Papua New Guinea.

I lived and worked in a total of four countries in the Middle East from 1977 to 1991. The last seven of those were in Bahrain, in the Persian Gulf, where I became a BSAC instructor. Every month, an issue of *National Geographic* (remember them?...) would arrive in my mailbox, and I was always inspired by the stories and images from remote and exotic locations.

Then in April 1988, there was an underwater image on the front cover, of an aircraft wreck in Papua New Guinea taken by David Doubilet, and inside was his story of diving there, including a wonderful image from Deacon's Reef.

It took another ten years before I finally made it there; the logistical challenge of emigrating to Australia with my young family had to be addressed first. I eventually found the spot Doubilet had taken his image, but sadly missing was a model and any underwater photographic capability on my part.

Over the years since, I have dived Deacon's Reef many times. About five years ago, I was able to capture a couple of images that I felt came close to those taken by Doubilet over 30 years ago. Underwater photography is very much a journey, and inspiration is a must to embark on it. Visit: **Deacon's Reef**

Goniobranchus leopardus nudibranch, on Tufi's house reef (above). Exposure: ISO 250, f/22, 1/80s. Gear: Olympus OM-D E-M5 camera, Olympus 60mm macro lens, Nauticam housing, dual Sea&Sea strobes; Diver at Mulloway Reef (left). Exposure: ISO 320, f/11, 1/80s. Gear: Olympus OM-D E-M5 camera, Panasonic fisheye 8mm lens, Nauticam housing, dual Sea&Sea strobes

Member of the local tribe at Baga Village demonstrates the construction of fishing lines. Exposure: ISO 250, f/8, 1/250s. Gear: Olympus OM-D E-M5 camera, Olympus 12mm-50mm lens, Olympus FL-36 electronic flash

Tufi, Papua New Guinea

Text and photos by Olga Torrey

Recently, I took a trip to Papua New Guinea; it was my first time visiting the country, which I had dreamed about since my childhood. Tufi Resort was one of the highlights. As the plane landed on the dirt runway, I looked out the window and saw a grass hut with a banner that read: "Tufi International." I knew there was no Starbucks here, but an incredible adventure was about to begin.

Tufi Resort had fast dive boats, so most dive sites were about an hour away from the dock. Once one arrived, the reefs were spectacular! Powerful currents and nutrient-rich water brought in many pelagic fish, including tuna, barracuda, hammerhead sharks, reef sharks, eagle rays and grouper. The clear water, giant coral heads and sponges impressed me. Mulloway and the other reefs were stunning. Tufi was a true paradise for underwater photographers.

In contrast to the spectacular reefs, the Tufi dock underwater looked like a junkyard. I wondered if I would find any living creatures there. To my surprise, I saw an astonishing variety of anemonefish, gobies, nudibranchs, shrimp, scorpionfish and banded pipefish. The dock at Tufi Resort became my favorite macro photography site.

During the stay, our group of divers was invited on a cultural tour of Baga Village. Members of the local tribe brought us to their village on outrigger canoes. We were greeted with villagers dancing in festive attire. Members of the local tribe demonstrated aspects of their traditional lifestyle, including how they made fishing lines, baskets for fruits and vegetables, necklaces of seashells, traditional cuisine, fire for cooking, clothing painted with traditional ornamentation, thatched roofs and even tattoos.

The stay at Tufi was a great experience. I cannot wait for the opportunity to return. It is a place that offers so much to see below and above the water's surface. Visit: **fitimage.nyc**

Freediver with outrigger canoe at Tufi. Exposure: ISO 250, f/8, 1/160s. Gear: Olympus OM-D E-M5 camera, Panasonic 7-14mm lens, Nauticam housing, dual Sea&Sea strobes

Gear used for underwater images: Nikon D800 camera, 16-35mm lens, Sea&Sea housing, dual Sea&Sea YS-250 strobes. Jellyfish (above). Exposure: ISO 400, f/13, 1/200s

Eagle (above). Exposure: ISO 1250, f/6.3, 1/1600s. Gear: Nikon D800 camera, Nikon 200-500mm lens; Salmon shark (top left). Exposure: ISO 400, f/11, 1/200s

Ravencroft Lodge, Prince William Sound, Alaska, USA

Text and photos by Ron Watkins

An adventure in the wild, both above and below the water, is why I travel over 3,300 miles to dive in frigid 50°F water. The elusive salmon sharks that frequent the area in pursuit of spawning salmon are what first drew me to the location, but after my first trip, I realized that the area has so much more to offer. Massive blooms of moon jellyfish, so thick they block out the sunlight, are another highlight, as well as photographing the salmon run in shallow nearby streams.

Dive sites include a variety of sloping underwater rock formations, pinnacles and kelp forests, which host an abundance of marine life. Dive sites are chosen based on water conditions, tides and currents, but my favorites are Manomi's Rocks, Luke's Wall and the area right off the Ravencroft Lodge. You can plan to see an array of macro subjects, including hooded nudibranchs, colorful shrimp, decorator crabs and an abundance of bottom-dwelling fish to keep even the most seasoned macro photographer busy. Larger subjects like the colorful red Irish lord, sculpin, rockfish, halibut, and if you are lucky, a giant Pacific octopus may be spotted on any dive.

Accommodations at the rustic, yet comfortable fishing lodge bring me back to childhood memories at summer camp where the days are long (20 hours of sunlight) and there are endless activities in nature. A favorite topside activity is skiff rides in search of bald eagles, sea otters, river otters, deer, elk and bear. Visit: **ronwatkinsphotography.com**

Hooded nudibranch. Exposure: ISO 200, f/20, 1/320s

Mexico's Quintana Roo

— *Cave Diving on the Yucatán Peninsula*

Text and photos by Pierre Constant

Dive guide Attilio coming out of a restriction with the spool, Cenote Zacil-Ha. PREVIOUS PAGE: Diver in the tunnel of Cenote Chan Hol

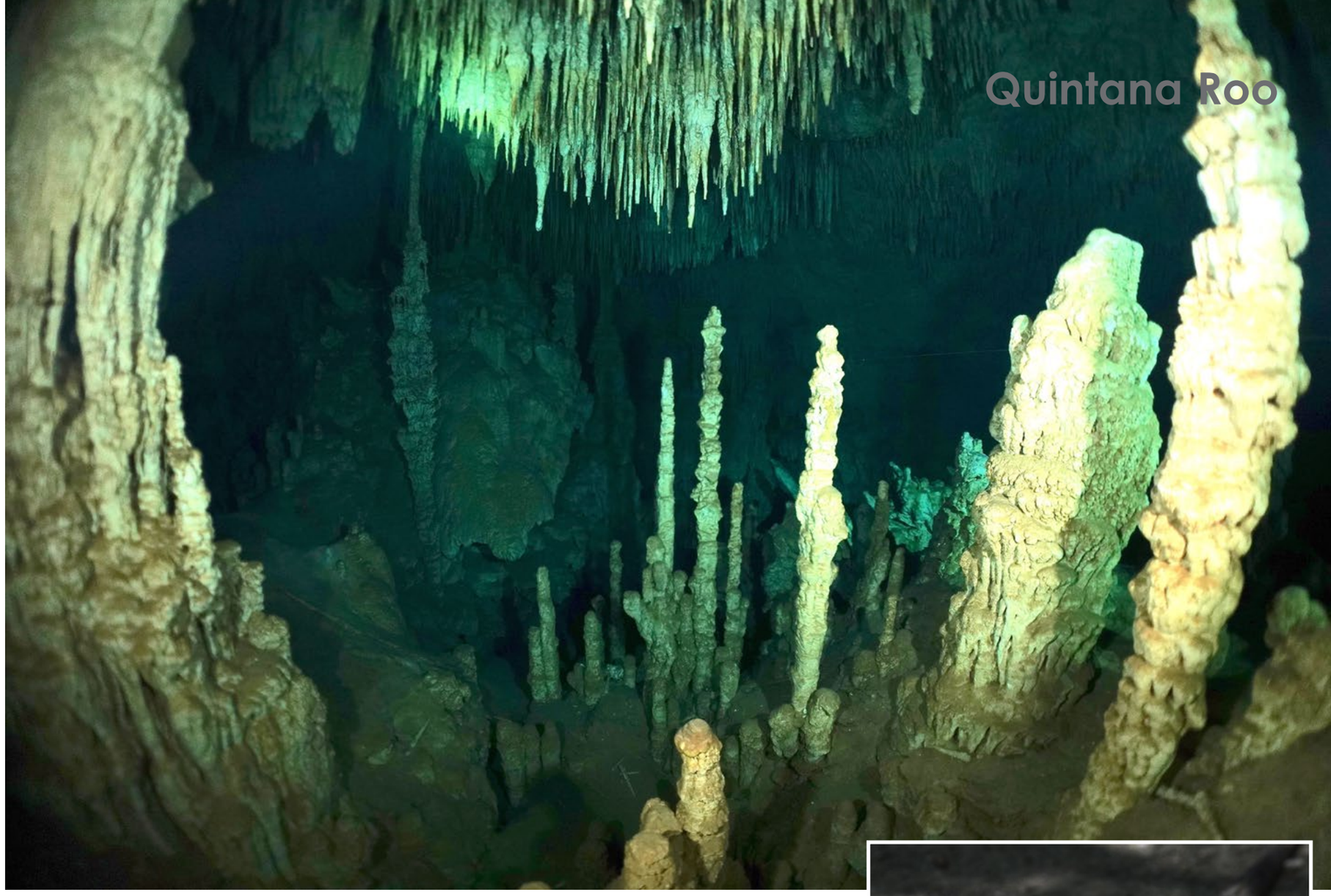
Author with sidemount and stage tanks (above); Diver among pillars in Cenote Zacil-Ha (top right)

As a cave diver, you do not come back from the Yucatán and say, "I have done Mexico," boasting with pride and glory. It takes more than one visit to fully appreciate the enormous potential the peninsula has to offer underground. That means having not only the guts for it, but also the necessary training and experience to be able to do so. "Rome was not built in a day," as the saying goes.

My first time in Yucatán was back in 1976, shortly after a devastating 7.5 magnitude earthquake had rocked Guatemala, just before the country intended to invade Belize over a historical border dispute. I was then a 21-year-old backpacker in blue jeans back then, hitchhiking my way across Latin America, from north to south. Learning Spanish was compulsory, and cave diving in Yucatán was virtually unknown in those days.

I came back to Yucatán in 2017. Frankly speaking, it was a bit of a shock. Tourism and incredible development had taken hold of the so-called "Riviera Maya." I felt I had landed on the wrong planet. Playa del Carmen was just made for the Americans, the crazy rich and party lovers. It was obviously a place to be "seen," show off and behave like a typical tourist, with straw hats and flower shirts, on an exotic beach holiday.

Mind you, I did not come for that. I would have run like a frightened rabbit, if not for a very noble goal: to become certified as a TDI Full Cave Sidemount Diver. I did the course with the superb, French-run dive operator Phocea Mexico. However, lest I forget, my initial cave diver training had been done in 2003 and 2007 in Mount Gambier, South Australia, with the reputable Cave Divers



Stalagmites and stalactites in Cenote Zacil-Ha (above); The jungle as seen from inside Cenote Otoch Ha (top left); Cenote Otoch Ha in the jungle (left); Iguana at Cenote El Eden (right)

Association of Australia (CDAA)—the tough ones "down under." I can still see my instructor Linda Claridge's smile from here, after all these years. "You can die for that sort of mistake!" she said to me once, after a poorly executed exercise. Well, I guess it did some good, because I never forgot.

Cave diving in Yucatán

With the Full Cave Sidemount certification in my pocket, I was ready for the real thing. I dived a number of caves and cenotes on the eastern coast of Yucatán and produced some articles about it. The year after that (in 2018), I returned for more, focusing this time on the western side of Yucatán, around Mérida, where cenotes and caves are noticeably deeper, in the 40m zone. It was a conspicuous problem for me, in regard to decompression and compulsory gas mixes. I was not prepared for it.

Year 2019 saw me again in Yucatán, for a brief tour, driving around the peninsula, from Quintana Roo to Campeche and Mérida, to have a look at different archaeological and palaeontological sites as well as hidden, out-of-the-way cenotes. Some of the old forgotten ruins I visited were just awesome and impressive in their own right. Eventually, I came to believe that I had seen enough of the Yucatán. I did not imagine I would ever come back.

However, with more than 6,000 cenotes (and counting), that could not possibly and realistically be the end. Once infected with cave diving, I had additionally caught the virus of the Yucatán caves. Out of the blue, I decided to return in early September 2020, with some new training in mind—as if I needed a good excuse to fly back.

Getting there during a pandemic

There were no direct flights from Paris to Cancun, so I had to fly through Mexico with a "pain-in-the-neck" transit at 3 a.m., taking me to Cancun with Aeromexico at 10 a.m. Despite the coronavirus pandemic, Mexico had decided to keep its doors open for tourism. Even so, the state of Yucatán was closed, however, Quintana Roo was welcoming visitors.

Quintana Roo

Cenote El Eden(left); Preparing the tanks under the overhang before the dive in Cenote Otoch Ha (above); Tarantula on the forest floor at Cenote Otoch Ha (right)

Motmot, Maya's sacred bird

Jonathan, my Full Cave instructor, was waiting for me. "You are my first student since the occurrence of Covid-19," he confessed. A face mask was mandatory in shops, supermarkets and restaurants, but on the streets, nobody really cared. Few actually wore the *cubre boca*, as the mask was called here, although it was well advertised. However, the use of hydroalcoholic gel was widespread, which you could find anywhere, anytime. My three-day TDI Stage Cave Diver course was to start the next morning.

Stage training

Jonathan drove me to Cenote El Eden, located 25km south of Playa del Carmen, where the practical in-water training would be conducted. The place was deserted, except for the odd iguana that had been missing the tourists for a few months, and a furry brown mammal that zoomed past in a hurry.

As the name implies, the Stage course involves the use of a third tank, which is clipped on the left side of the body. The prerequisite for this level is Full Cave Side-mount certification. Jonathan first demonstrated the rigging of the third tank: a ring with a clip on the lower part of the tank, plus a clip with a bungee around the neck of the valve.

Once in the water, on the edge of a wooden platform, sidemount tanks would be donned first. With a movement of the left hand between the body and the side tank, one would then pull the bottom clip of the stage tank towards the back where it would be hooked to the D-ring at the left rear side of the harness. The top clip of the neck valve was to be attached to the front D-ring of the harness's shoulder strap.

Ideally, the stage tank should lie below the sidemount tank, aligned with the body. The regulator hose of the stage is brought around the back of the head, and the regulator itself is taken into the mouth from the right. One is supposed to breathe from the stage tank first.

I was a bit apprehensive about looking like a Christmas tree, with so much to carry. Over time, I realised that the load of the stage tank created a growing tension on the lower right side of the back, as one needed to compensate to keep one's balance in the water.

In-water session

Next, we submerged for a swim under-water around the cenote "to get the feeling." Jonathan showed me how to unclip the stage, leave it on the bottom, and put it back on again. With a gesture of his hand, he invited me to do the same, without losing my buoyancy control! I had to repeat the exercise twice. Finally, I was required to unclip the lower part of the stage, and push the tank forward, as we passed through a "restriction" between the rocks.

One hour passed in 25°C water; I felt fine in my 5mm shorty, but the picnic lunch afterwards was much appreciated!

We were back in the water once again, for afternoon training. Jonathan placed a line between two stumps of wood on the bottom, as the fish seemed to gaze in anticipation: "Are we going to play a game?" In the cave environment, we would get rid of the stage first, at some point

Dive guide Attilio among pillars in Cenote Zacil-Ha (above), tying up the spool (right) and heading back to Cenote Zacil-Ha (top right)

during the penetration, and must therefore clip the tank onto the line, "preferably in the direction of the exit," so we would know which way to go after retrieving the stage. It was easy to understand, but arguably not so straightforward to perform, because it was either hard to unclip the lower part or the upper part, if the bungee was too tight.

Adjustments are a very personal task. The other variable is the neutral buoyancy factor, which is affected by carrying or not carrying the stage, right? So, after I dropped the stage on the line, and closed the tank valve, Jonathan gestured to me in mime to continue along the line, as if going farther into the cave. In other words: Turn around, come back and retrieve the stage. The sudden change of weight made me crash into the sediment and grasses on the bottom. "Remember buoyancy control!" he said emphatically, upon debriefing.

Repetition and challenges

The next morning, I had to do the exercise all over again. Visibility was good, there were only a few people around, the sun was shining, and my buoyancy was performed well. Jonathan gave me the OK signal.

It got more complicated when he wanted to simulate zero visibility conditions. For this exercise, he handed me a "black mask" underwater, which I had to put on my face. (Fortunately, he was not like my former instructor Linda, who had surreptitiously placed a black mask on my face from behind, without advance warning! Gosh.)

Anyway, with my eyes closed and a hand on the guide line, I progressed towards the stage clipped to the line, feeling it with one hand, then grabbing the lower clip and attaching it to my D-ring while still holding the guide line with my right. Then I grabbed the other clip and attached it to the D-ring on the shoulder strap—don't forget your buoyancy, good man! I then opened the stage valve, swinging the regulator hose over my helmet, and switched regulators to breathe from the stage. I performed this manoeuvre without stress or hurry, and Jonathan gave me the thumbs-up, when I took off the black mask. Some miracles do happen!

That afternoon, we headed for a cave environment. We got into one of the cave tunnels with a halocline, which provided us with "exquisite" blurry vision, before we emerged into clear water. Jonathan signalled me to drop the stage on the guide line at 100 bars. We proceeded farther on sidemount, until we reached 130 bars. As we turned around, I took the lead, retrieving the stage and crashing a bit on the bottom. The whole dive lasted 76 minutes at a maximum depth of 15.4m. I did not

Leaving a stage tank on the guide line in Cenote Zacil-Ha

get the thumbs-up for this one… Nobody's perfect.

It rained heavily as we drove back to Playa del Carmen, and Jonathan criticised my swimming below the guide line at times. "People would judge you negatively for this," he claimed. Back at the hotel, the room had not been made up yet, and the internet did not work… bummer. Should I call it Murphy's Law? "Murphy was a cave diver," argued one famous instructor in Tulum.

Cenote Otoch-Ha

On the third day, we drove to the end of a pot-holed dirt road in the Yucatán jungle, with pools of water. Cenote Otoch-Ha was part of the Sac Actun system, which had recently been discovered to be over 369km in length, connecting 227 cenotes!

The key to the main gate was obtained at a dive shop on the way, and I had to pay an entry fee of 200 Mexican pesos (US$10). Surrounded by trees and vines, the cenote looked dry and rocky at first glance, but there were water rings on the surface at the inner periphery, under the overhang. The place was full of mosquitoes. A large reddish-brown tarantula with black legs crawled by as we donned our equipment in silence.

Covered with leaves, an old cement stairway snaked down to a wooden platform overlooking the water. "Careful, it is not very reliable," joked Jonathan. The water surface was pasted with a white film of calcareous sediments. The reflection of the crescent moon on the water rotated counterclockwise, as we ducked underwater, following the guide line.

At the first T-junction, we veered right, after leaving cookies on the line. At 36 minutes into the dive, with 100 bars left in the stage, I waved my dive light and the instructor signalled me to drop and clip the stage onto the line. Pushing farther into the cave on sidemount, we reached a second T-junction, where the water was very clear. The tunnel was wide, with stalactites, stalagmites, and sometimes straws hanging from the ceiling; pillars were everywhere. It was a beautiful cave. When I had 150 bars left in the side tanks, we were 55 minutes into the dive. Jonathan reckoned that we had covered 800m to 1,000m, with a maximum depth of 13.9m.

Leading the way back, I retrieved

The window (above) and fish (left) in Cenote Carwash; Dive guide Thibault inside tunnel of Cenote Cristal (right); Entrance to Cenote Dreamgate (lower right)

the stage, adding air to the wing in anticipation, and immediately rose like a balloon. A bit of a mess there, but I managed eventually. Back at the entrance for a safety stop, the stage was almost empty, and I had to switch to the sidemount tanks. The total dive time was 107 minutes—my longest cave dive ever. Jonathan was satisfied with my performance—a good thing indeed. Certification was granted. I had pushed my limits a bit. However, I realised that there was no way I would be able to dive while holding a camera mounted with arms and strobes, and carry a stage at the same time!

Cave photography

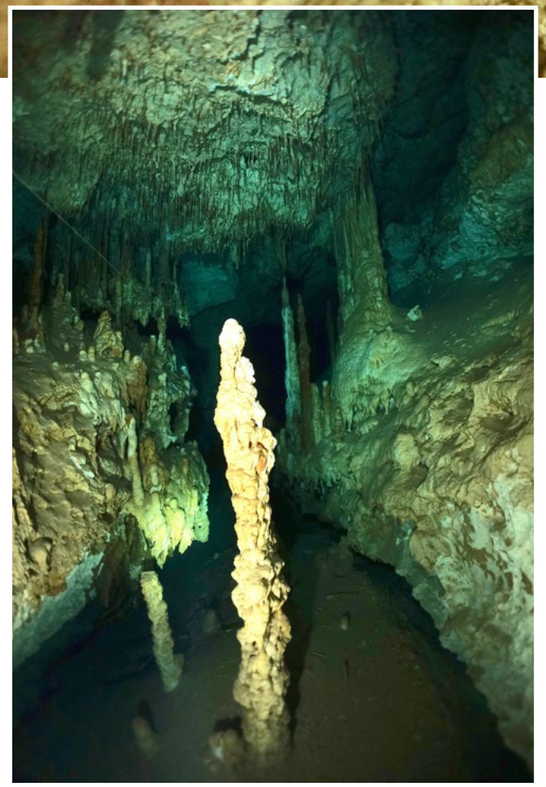
I remained an extra week in Playa del Carmen in order to do some more cave diving on sidemount, for the sole purpose of doing some underwater photography. Starting off with dive guide Attillio of Phocea Mexico, we dived Zacil-Ha and Carwash. Attillio had some fun taking me into the "Rabbit Hole," a narrow, snaking tunnel, which was rather challenging with a camera. Not the coolest thing for claustrophobic people.

"How long is this going to last?" I wondered, until we emerged into a nice, fully decorated tunnel, and the very picturesque "Hall of Tears." That was for starters. The main connection from Zacil-Ha to Carwash was black and dark—not very alluring. However, rising towards the lentil-shaped window of the Carwash cenote—with its psychedelic, apple-green colours and dead logs and branches emerging from the bottom—was a visual treat, for sure!

Cenote Cristal/Naharon

On Day Two, dive guide Thibault led me to Cenote Cristal/ Naharon—a lush green oasis of exotic palms and trees, just west of Tulum. We were nearly the first to arrive at the site, if not for two bathers, taking a leisurely morning swim. Inside the cenote, a very dark black tunnel led us down to the halocline at 18m. We made two jumps to the left to reach a stunning chamber with stalactites, stalagmites and pillars.

Interestingly, this cave had been inhabited by prehistoric people. The skeleton of a 25- to 30-year-old woman, "The Eve of Naharon," was discovered here in 2000, at a depth of 23m, and carbon-dated to 13,600 years ago. It has a similar skeletal type to that of the people of Southern Asia, rather than Northern Asia, and could be viewed at the Museo de la Prehistoria of Dos Ojos Park, on the way back to Playa del Carmen.

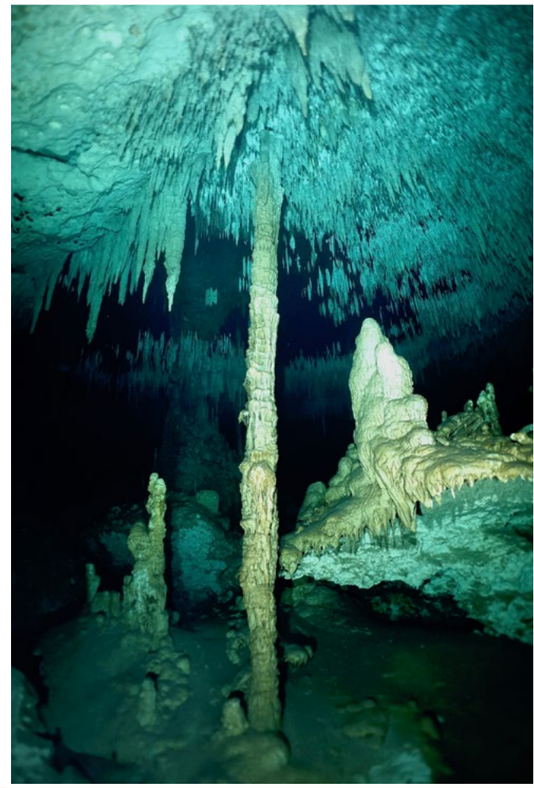


CLOCKWISE FROM ABOVE: In Dreamgate, passage under a ceiling of stalactites; Shower of stalactites and a pillar; Pillar, stalagmites and a shelf; Chamber of stalactites, stalagmites and pillars; Stalagmite in the canyon of Dreamgate

Dreamgate

Dreamgate was a semi-cenote in the jungle. Tanks were brought down on a rope to a wooden platform below the cliff. Seldom visited, with an entry fee of 380 pesos (~US$19), it was a bit of a hidden gem, which no one will want to show you, unless you are a decent and responsible cave diver with a serious regard for the overhead environment.

Rather shallow, with an average depth of 4 to 5m, Dreamgate was highly decorated throughout. It included a canyon in some parts, and a halocline was found here and there. Towards the end of the tunnel, after two jumps to the left, it got really narrow with restrictions. The maximum depth was 10m, for a total dive time of 70 minutes.



Diver and exquisite pillars (above) and Mayan pottery and bones (left) in Cenote Chan Hol; In Cenote Dos Pisos, enchanting balcony under the ceiling (top center), stalactites and stalagmites meet, beginning to form pillars (top right) diamond-shaped passage under a ceiling of stalactites (right) and silent exploration under the stalactites (far right)

Cenote Chan Hol

On Day Three, we headed southwest of Tulum, on the road to Chetumal. Cenote Chan Hol ("Little Hole" in Mayan) is right next to the road on a farm with manicured gardens, separated from the highway by an old stone wall. The site was discovered and explored by Kim Davidsson in 2004.

A flight of stairs led to a small entrance, with poor to zero visibility underwater. Suddenly, you find yourself in an antechamber with a ledge on the right side, displaying two pieces of Mayan pottery and a few bones. The long winding corridor of the cenote had pillars, arches, helictites (a distorted form of stalactites) on the ceiling, as well as the usual stalactites. The cave floor was bedecked with deposits of white calcite flakes.

As I swam through the initially narrow, then widening passage, I imagined how Chan Hol had been a refuge for prehistoric peoples over 10,000 years ago, during the last ice age. Three Paleoamerican skeletons were discovered here from 2006 to 2009, and in 2016.

In 2009, a cave diver found human remains in Chan Hol II, some 1,240m southwest of the cave entrance, at a depth of 8.5m, then posted the photos on social media in February 2012. By the time the Mexican archaeologists came in late March, the site had been vandalised. The skull and bones were unscrupulously stolen, never to be found again.

Fragments of a hip bone embedded in a stalagmite, dated to 11,311 years ago (plus or minus 370), revealed after analysis that the fragments came from a young male. However, the skeleton was estimated to be from 13,000 years BP, one of the oldest ever found in Mesoamerica. An archaeologist from Dallas, Texas, claimed that there was convincing evidence that humans colonised the Americas over 14,000 years ago.

Cenote Dos Pisos

Dos Pisos was a small cenote on the El Campesino ranch and involved a short 80m walk through the jungle from the car park. The keyhole entrance was followed by a twisting passage to get to the main tunnel, which was highly scenic, with a succession of chambers and calcite flakes on the cave floor. The maximum depth was 6m, and the dive lasted 70 minutes. Rain caught up with us as we exited the place.

In Cenote Calavera: Diver with cluster of stalagmites (above) and the guide line running through a very white tunnel (top right)

Cenote Calavera

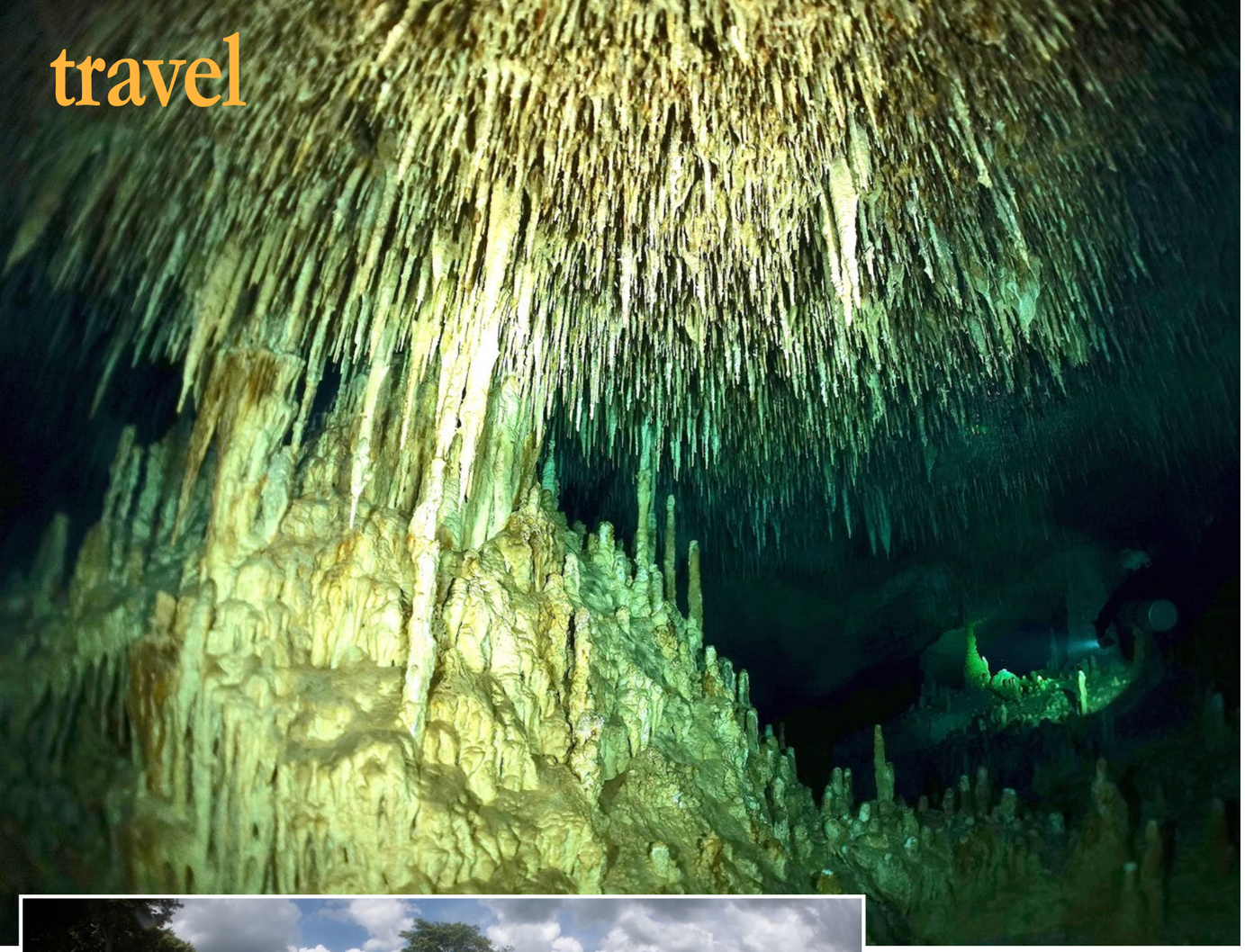
Day Four saw us heading north, in the direction of Coba. On the right side of the road was the renowned Cenote Calavera (Skull). A hefty fee of 400 pesos (~US$20) is charged per cave diver, plus 200 pesos for the right to take photos! In addition, the guide must pay half price.

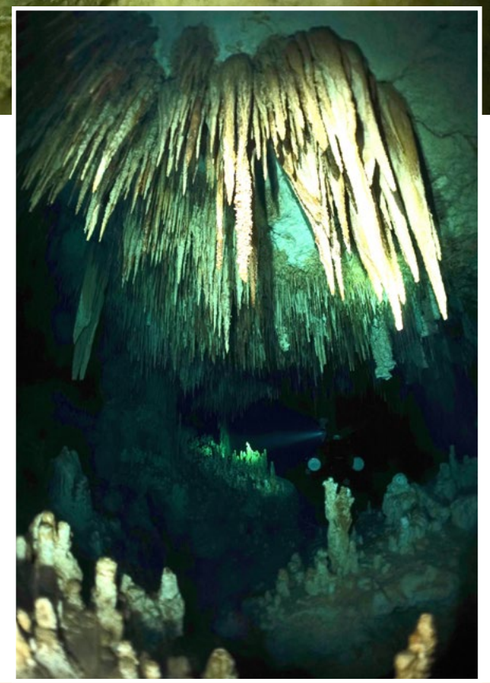
This semi-closed cenote is round, with a thick wooden ladder coming straight down into the water. One has to tie a piece of rope at the bottom of the stairs, in order to clip the tanks. Another line is fixed to the other side, to which a camera can be clipped.

This popular place attracted lots of people from all walks of life, posing for photographs at the edge of the hole. It was a bit of a distraction, but I regained composure when I hit the 26°C water.

The plan for today would be: T-right, T-left, T-right and a jump left. The halocline was met at 14m, in most of the winding tunnel, ending up in a canyon with crystal-clear water below the halocline. Madonna Passage was truly impressive, with a giant tooth-like stalagmite right in the middle of it. The maximum depth was 18.6m for a dive of 61 minutes.

Dive guide Thibault with massive stalagmite (above) and lowering tanks into Cenote Calavera (bottom left)





At Cenote Hatztun Aktun: Equipment is prepared before a dive in the cenote (left); Stalactites descend like fireworks in the tunnel of the cenote (top left); Diver swims between pillars and stalagmites (top right); Diver under a ceiling of stalactites hanging like the Sword of Damocles (right)

Cenote Hatztun Aktun

Farther away, in the direction of Chetumal to the southwest, Hatztun Aktun was a wide-open cenote at the end of a dirt road. There was virtually no one around. A few convenient steps led to the central pool of water, which was green and dirty, with a high temperature of 29°C. As soon as we dived underground, the water temperature dropped to 25°C; we were feeling suddenly cool! With a dark, spongy and silty bottom, the water cleared up as we entered the large tunnel, which climbed up and descended down to a maximum depth of 21m.

The cave was full of thin pillars in clusters, with lots of helictites on the ceiling. We hit the halocline at 20m. Thibault wanted to proceed farther into the narrowing passage, but I had already reached my turning point. On the way back, he lured me with a jump to the right, indicating "for a little while" with his thumb and middle finger. Soon afterwards, he plummeted into a rabbit hole, zigzagging downhill, and I waved my dive lamp frantically before he disappeared around the corner! The rain came down on us, as we made it back to the pick-up point, just in time.

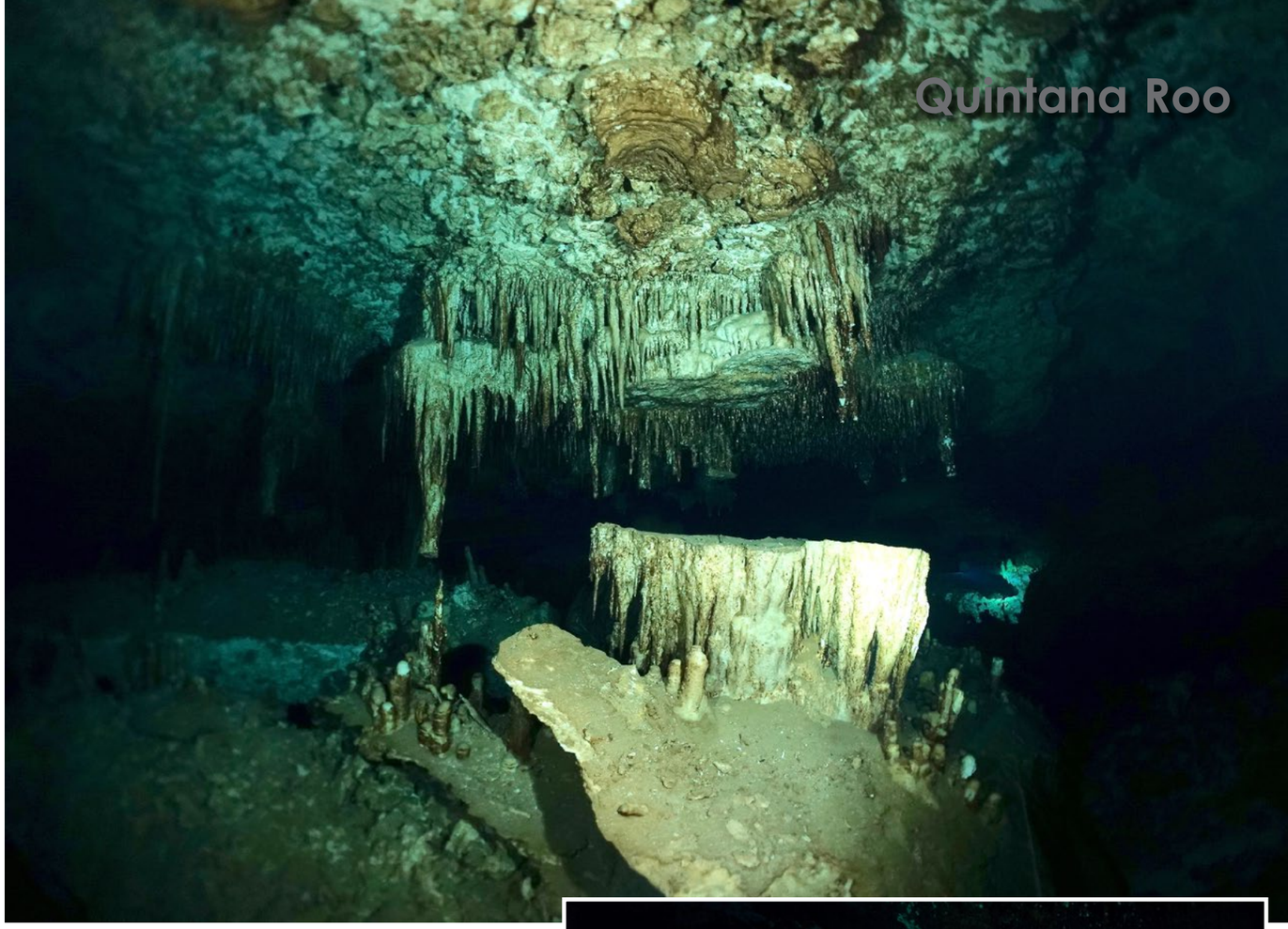
Cenote Minotauro

On my last day, the guide recommended Minotauro—a turquoise-blue pool of clear water with white sand and rocks, lying among the palms like a Japanese botanical garden. Idyllic. Diving the cenote, we squeezed through a narrow passage underwater for some time before it opened up into a larger tunnel with a bonanza of decorations. The speleothems, stalactites, stalagmites and pillars ranged from yellowish-brown to even a dark red, evidence of strong organic tannin colouration. Some stalactites displayed an elephant foot, with nothing underneath for support.

Strikingly, lots of big stalagmites and stalactites were tilted or lay broken on the cave floor—definite proof of an earthquake in the past. A whole block of stalactites had even collapsed from the roof—at least a couple of tons' worth! This may be unusual; however, considering that the Caribbean Plate is in subduction under the

Broken stalactites in Cenote Minotauro indicate a past earthquake (above); Light beams in Cenote Minotauro (top left); View of entrance to Cenote Minotauro in the jungle (left)

Arch entrance (left) and view of jungle from inside String of Pearls cenote (above); In Cenote Minotauro, a collapse of a cluster of stalactites from the ceiling due to a powerful earthquake



Yucatán Peninsula, it was not surprising.

Referring to the Greek legend, the cenote's name, "Minotauro," stood for the fact that the cave was a real maze, with ramifications everywhere. Its maximum depth was 13.2m, for a dive of 67 minutes.

String of Pearls

The ultimate dive took place northeast of Playa, in the direction of Puerto Morelos. A cenote found in the forest, String of Pearls had an archway type of cave opening, with very shallow water for the first 30 metres or so. A curtain of fibrous roots hung down from the ceiling like "rasta" dreadlocks. Bats came in and out of the cave as we entered, knee-deep in water, lugging tanks farther in. There were swarms of mosquitoes for the bats to eat in the surrounding jungle!

As we penetrated a narrow passage, the cave floor suddenly dropped to 11m before rising up again. Unexpectedly, the camera battery died on me shortly after. I would now have to enjoy the scenery with my eyes only. The cave was very pretty. Lots of calcite crystals covered stalagmites and stalactites, as if budding like desert flowers, pinkish-white in colour. A jump to the left saw us swallowed by a narrow tunnel, where the halocline was present towards the end. It was a site I will remember with a pinch in my gut, since I was not able to capture any digital memories.

As we drove back to Playa del Carmen after a full day of diving, Thibault asked: "So, are you off to Paris tomorrow?"

"Not quite," I replied. "I'll take a day off, then I'll go to Tulum."

"A beach holiday or something?" he smiled, inquisitively.

"Hell, no!" I said. "I'm starting a DPV Cave Diving course in two days!" ■

*Thanks go to Phocea Mexico (**phocea-mexico.com**) and ProTec Tulum (**ProTecDiveCenters.com**).*

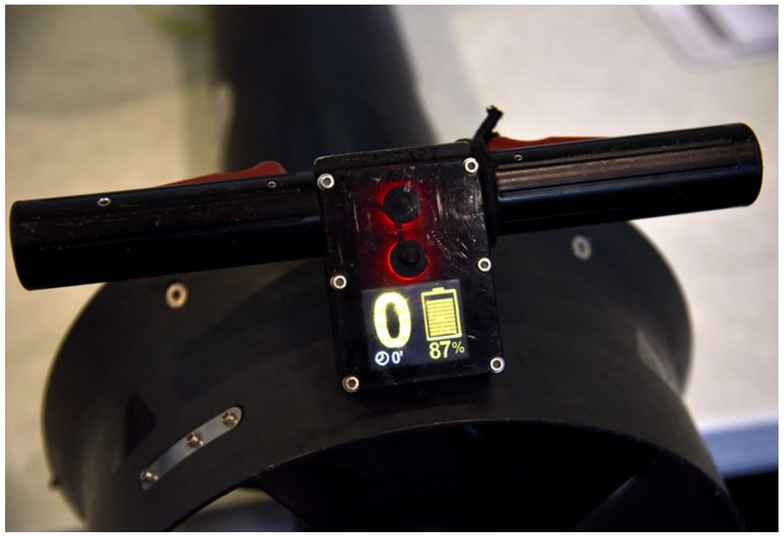
*With a background in biology and geology, French author, cave diver, naturalist guide and tour operator Pierre Constant is a widely published photojournalist and underwater photographer. For more information, please visit: **calaolifestyle.com**.*

Dive guide Thibault places a "jump" on the main line in Cenote Minotauro.

Tulum

— DPV Cave Diving Course in Mexico

Text and photos by Pierre Constant



Kim Davidsson of Protec Dive Centre introducing the Seacraft diver propulsion vehicle, or DPV, during the cave course (above); The screen display of the Seacraft DPV (left); The beach and Mayan archeological site at Tulum (top left). PREVIOUS PAGE: Into the cave depths of Cenote Cristal in Yucatán, Mexico

Tulum has changed a lot since I was here last, well over 45 years ago. Once a mere dusty village with beach huts, it is now a booming town with a main street full of bars, restaurants and tourist shops.

Turning the wheel to the right at a crossroad, I heard a loudspeaker blaring a warning message straight out of a science fiction movie: "Precaución, you are entering a highly dangerous zone…" It clearly mentioned the alert level of Covid-19. I soon found ProTec Dive Center and The Basecamp hotel near the end of Avenida Satélite. "Oh, we have had this scary recorded message for months now. Nobody pays attention anymore. It's pathetic!" exclaimed Kim Davidsson, the director of customer experience.

After quickly settling my belongings in one of the rooms upstairs, I ran downstairs again in no time. My Diver Propulsion Vehicle (DPV) Cave Diving course was to start right away in one of the small classrooms. Kim, who is a Swedish TDI instructor, has been a resident here for over 20 years. "You'll be the only one today. Tamita couldn't make it this time."

Starting with mutual introductions, Kim went into the theory of DPVs, the equipment and a workshop where I had a close look at the Polish-made Seacraft DPV, an elongated, round-nose, rocket-type of machine, with a propeller inside a metal ring, two handles as expected on a scooter, and an electronic dashboard with lights and numbers—a rather impressive piece of equipment for a neophyte like me. "A sophisticated toy worth no less than US$8,000 to $9,000," concluded Kim. I was definitely eager to know how it worked and to understand the concept of a "tow-behind" scooter.

About the DPV

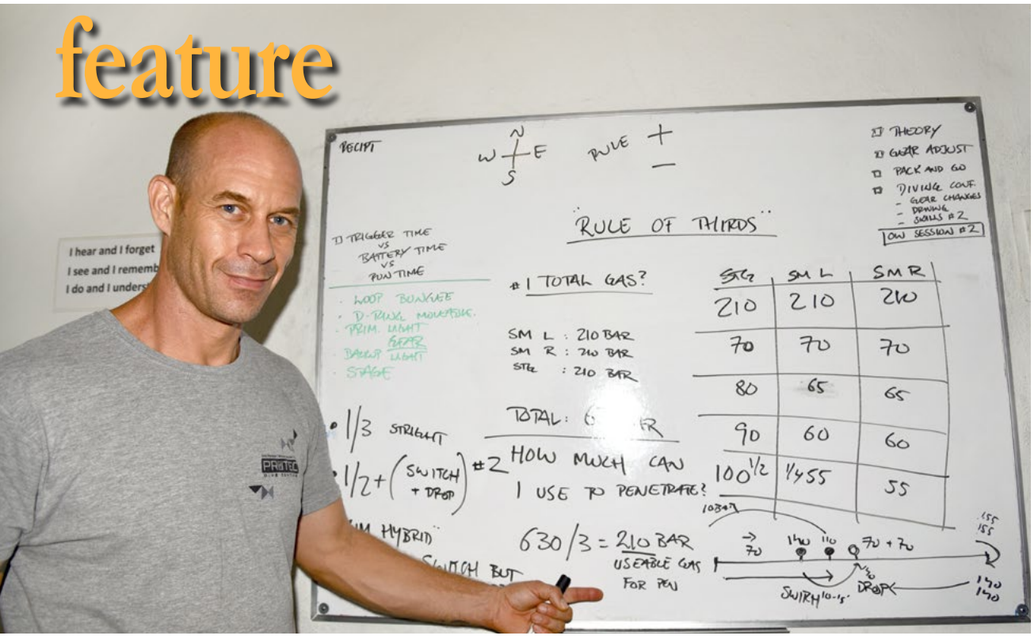
Basically, the DPV is electronically charged by a powerful battery, with up to four hours of runtime. When you turn the switch on, the screen lights up, and you can see the percentage of the battery charge in the lower right corner. The two little buttons, placed one above the other on the dashboard, are the gears for moving upwards and downwards when pressed.

In the lower-left corner of the screen, you can see the Speed Indicator, which goes from 1 to 9, and even to the "R" position, which stands for "Reverse." Next to it, you have the "Runtime." An average speed would be 4 to 5, fast is 6 to 7, and 9 is crazy fast—there are 10 speeds altogether, including the speed in reverse.

The trigger is found on the handles of the DPV, on both the left and right sides. "And that little piece of loop bungee here is for the cruise control, and it will maintain the chosen speed at all times," he smiled. I began to feel the thrill of it all. This was either good or bad, depending on one's mood and mental state. Crikey!

Cenote Carwash

After a picnic on the way there, we were off to Cenote Carwash. Once underwater, I could not manage to hold the DPV steady. As soon as I pressed the trigger, it pointed its nose up each and every time, like a bucking horse. Overwhelmed with a feeling of frustration, I realised it was not as easy as



Kim shows the "Rule of Thirds" for DPV on the whiteboard (above); Tanks and DPV stand ready for the day at Protec Tulum (right); Divers in Carwash cenote (far right)

I had thought.

After a while of desperately trying to stabilise the machine, with no improvement whatsoever, the instructor's annoyance was palpable. Suddenly, as we surfaced, he made it clear that it was not too late to give up on the course. In short, he suggested that I could quit if I chose to. Surprised, I took it as an insult.

"You should be neutrally buoyant!" advised Kim. In short, if the scooter pointed up, you were negatively buoyant; if it pointed down, you were positively buoyant. "Do not manhandle the DPV, let it pull you!" he said. "Always remember: Buoyancy, trim, position, action."

Eventually, I made the necessary corrections, and it worked better. Different skills were practised, like changing hands when holding the scooter, deflating, and clipping a dive torch on and off the D-ring on the back of the unit. We drove around the pond a few times at speed 4, turning, changing directions sharply, changing speed, stopping abruptly, and pulling the DPV backwards to hold it by the front handle. After an hour and a half in the water, I started to feel a bit cold.

Then it was back to ProTec's office in Tulum for a compulsory debriefing. Kim showed me the GoPro videos of my evolution underwater. It turned out that a number of necessary adjustments were needed on my gear and harness.

The waist D-ring should be moved farther back, roughly above the hip bone. I should have separate bungee cords to hold the valves of the sidemount tanks, instead of one continuous bungee running from one side to the other side along the shoulder blades. Finally, the tank rings holding the clips should be moved farther up.

The revised configuration would first allow for a better trim of the tanks along the sides. Secondly, the tank valves would come below the armpits to facilitate greater ease of movement for the arms in front of the body. I suddenly grasped the advantages of all these key adjustments. At the end of the day, a customised configuration is of the utmost importance.

Day Two

The theory part of the course took place in the classroom, starting with the history of DPVs, followed by a lecture on gas consumption. The travelling distance with a DPV is affected by breathing and therefore implies the need for gas management. The fact is that swim time is three times greater than DPV time. Back in 1984, the Tekna DPV had a runtime of 60 minutes. Nowadays, the Seacraft can run for four hours.

Realistically speaking, what is the point of penetrating so far into a cave, if you cannot come back—either because you run out of air, or if the DPV fails for some obscure reason? The awareness struck me between the eyes. Could I make it back from the far end of a cave? If the DPV fails, I would need three times as much time to return by swimming.

Planning accordingly leaves no other option. It means, for example, that 35 bars on the trigger is equal to a 105-bar swim. Should you use half of your stage tank for penetration before dropping it, you should only use a quarter of your sidemount tanks afterwards. Alternatively, using a third of your stage tank means using a third of your side tanks afterwards. It is therefore necessary to consider the total amount of gas and divide it by three for penetration.

Cenote Cristal

That afternoon, we went out to dive Cenote Cristal. A Mayan family with

The author after a dive at Nohoch Nah Chich (above); Detail of dive map of Nohoch Nah Chich (left); Cenote Nohoch Nah Chich (top left)

kids was having some fun playing in the water there. With all our equipment, we looked like aliens from outer space. Laying down the tanks and the gear on the wooden steps, we took up a lot of space. The kids moved shyly to the sides, staring with curiosity.

I had to practise the drop and retrieval of the DPV on the guide line. The tow cord had to be clipped first, followed by the nose clip of the DPV, with a double twist. We entered and moved through the cavern for a while, laid the DPV on the line, retrieved it and exited. Eventually, Kim left me to drive the scooter alone around the cenote, for comfort, while he reeled back the line. Another hour-and-a-half session in the water, I fared better today with buoyancy control and the effortless pull of the DPV.

At a local fruit stall in town, next to a small park, Kim treated me to an agua de maracuya (passionfruit water). A big orange signboard read: "Obligatorio uso de cubre boca – Mantenga su distancia – Sandwich de jamon y queso M$20" (Face mask compulsory – Keep your distance – Cheese and ham sandwich 20 pesos).

Kim showed me the video of my new trim on his cellphone, with the position of the tank valves under my armpits, and the tanks aligned to my body. I was filled with contentment, as Tulum's city lights glowed along Satelite Avenue, and a peaceful seafood dinner at Mil Amores restaurant with a cerveza Modelo Especial (beer) sealed the evening.

Cenote Nohoch Nah Chich

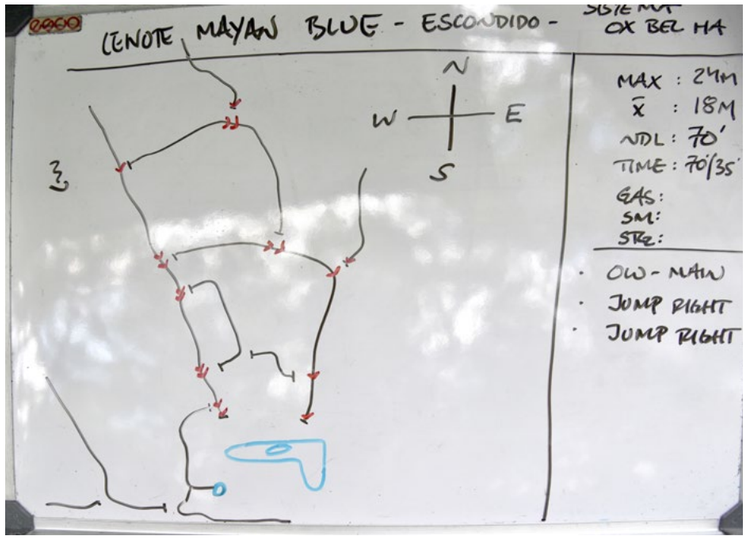
The next day, the classroom session was short. The theme we focussed on today was surface air consumption. The chosen site for diving was Cenote Nohoch Nah Chich, a beautiful cave with a long ornate tunnel.

Different case scenarios would be studied and analysed. First, we did a swim with a sidemount configuration over a distance of 15 minutes in and 15 minutes out, leaving a cookie on the guide line for reference. The same distance in and out was covered while breathing from the stage. The operation was repeated again, this time with DPV speed 4—still breathing from the stage. Finally, the procedure was repeated once more with DPV speed 6. All the above took place at an average depth of 4.1m, which remained constant.

The reasoning behind it all was to calculate the time taken for the same distance, and for each exercise, the gas consumption at the beginning and at the end, and the number of bars converted to litres. In the end, the purpose was to calculate the surface air consumption (SAC), when the number of litres used was divided by the time, and then by the depth in atm.

The instructor brought his slab underwater in order to write down all the data precisely. I performed the return swim in 30 minutes, and the same stretch at DPV speed 4 in 12 minutes 30 seconds, and at DPV speed 6 in nine minutes. At that speed, I felt like I was flying, and the stage hose over my shoulder was shaking like a leaf in the wind. Kim placed it under my armpit. Problem solved. Negotiating curves to the right or to the left was under control now, even the sharp ones.

In the next skill exercise, I was to pretend that my scooter had suffered a failure. Then, Kim would tow me, with the front of my DPV clipped to the back D-ring of his harness. During



Cenote Mayan Blue or Escondido (above); Map sketch of our dive at Mayan Blue (right); Stalactites and stalagmites decorate the chamber in Cenote Choj-Ha (top right)

the procedure, I remained streamlined, slightly above and behind him to avoid the "prop wash," shining the way forward with a dive light attached to the back of my hand. Although he drove the DPV at speed 6, it felt like we were going at speed 4. In fact, we took the same amount of time to cover the distance as when I made the trek at speed 4.

Now, it was my turn to tow Kim. My concentration and performance were optimum. Kim shook hands with me, proving me right. Eventually, I dropped the DPV on the guide line, then the stage, and retrieved them before exiting. I was elated with renewed confidence.

Last day

The last day of the course would take place at Cenote Escondido, also called Mayan Blue, located across from Cenote Cristal on the way to Coba. It was an elongated lagoon in lush vegetation. The plan was to scooter 90 bars into the main tunnel and 90 bars out.

At the end of the lagoon, at the cave entrance, there was a narrow vertical cleft, down to a depth of 20m. Here, we soon hit the halocline, and Kim zoomed ahead at speed 6. Riding in his wake, I hardly saw anything, except for a blurry halo of light in the distance, because of the huge disturbance caused by the halocline. Zigzagging left and right, and up and down—it felt like I was on a plane lost in the fog. I wondered how I did not bump into the walls or curves along the tunnel. It was a crazy, uncomfortable sensation. Kim did not seem to worry about me, banking sideways once in a while to check if I was still behind him. "Riding a DPV is the greatest challenge and highest level in cave diving," he confided to me later.

Checking the depth on my dive computer, I realised with amazement that we were cruising at 24m. Reaching a double red arrow on the guide line, Kim placed a white arrow behind it, with a jump to the right. We entered a small tunnel with very nice chambers. There were 130 bars left when we reached a second jump. I waved my dive torch to signal the turnaround.

Leading the dive now, I did not suffer any side effects from the halocline—that was left for Kim this time! I did, however, notice a slight blurry line, just above eye level, as I slowly moved upwards. Back below the cave entrance, the DPV and stage were dropped on the line. When retrieving them again, I messed up a bit with the stage, swirling around and stirring up the bottom as I tried to clip it to the rear D-ring of the harness.

"This is unacceptable!" thundered Kim, when we were back at the car. A correction was made to my sequence with the stage, in four clear steps. Afterwards, I came back to the lagoon like a miserable-looking dog, with its tail between its legs.

I was already in the water for the second dive, with the tanks clipped in, when the O-ring of my regulator's swivel suddenly sprung a leak. Bummer! In record time, Kim was out of the water, running back to the pick-up, and returned with a spare O-ring and the necessary tool to install it. I was impressed with this very efficient professionalism.

The plan was now to dive Mayan Blue's tunnel B, up until the two red arrows on the guide line, and then turn

around to reach a single white arrow marking a jump. In the cenote, Kim placed his spool line on the arrow, after we dropped the DPV and the stage. We proceeded on sidemount into a flat narrow winding tunnel with a low ceiling, purposely named "Death Arrow Passage." The depth was 22m, and soon, we penetrated a breathtaking chamber with pillars and stalagmites, which we passed through until we reached another jump. With 140 bars left in the side tanks, I signalled the turnaround.

Leading the way back to where we left the stage, I picked it up, paying attention to my buoyancy in a decent manner, collected the DPV and scootered back to the lower cave entrance without incident. Rising up inside the terminal chimney, Kim pointed to my dive computer, which indicated an unexpected 15-minute decompression stop! A maximum depth of 26m was recorded for a dive time of 54 minutes. After Kim showed me speed 9 with his fingers, I finished the last five minutes of decompression time in the lagoon, doing loops at a hair-raising speed—"crazy fast" for sure, but I managed satisfactorily. Afterwards, the instructor shook my hand heartily. I did well—a happy note after a tense day.

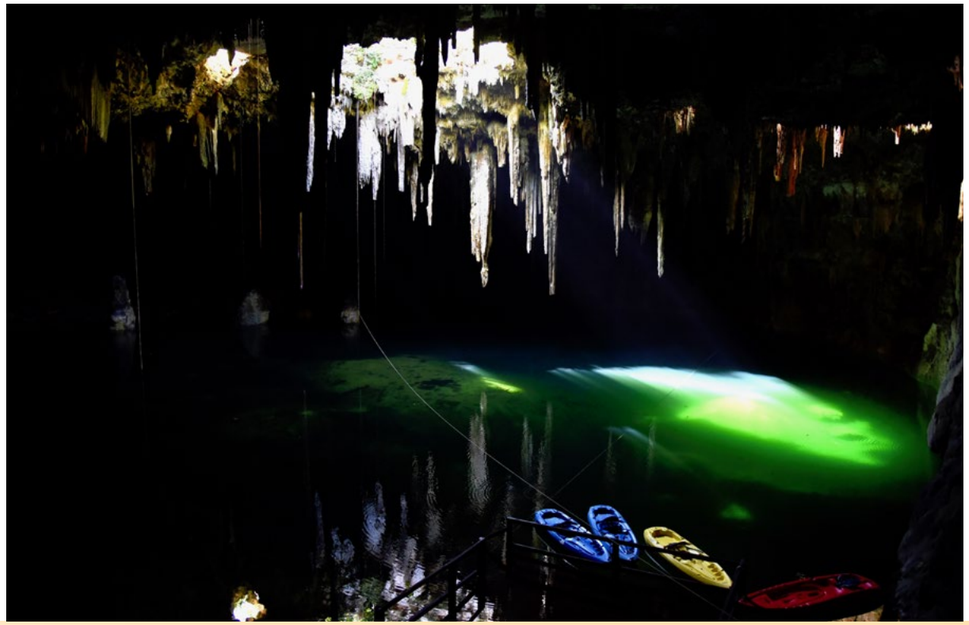
Afterthoughts

As thrilling as the DPV Cave Diving course may be, it teaches you one thing worth considering: You are playing with the far side of your life, mate. Don't you forget it. ■

Restaurant Taquera El Sabor Mexicano in Tulum (left); A skull painting and decorative textiles in Tulum (below); Cenote Xcanahaltun in Yalcobá (bottom)

Bather floats under a beam of light in Cenote Suytun (left); A lunch of tacos at Restaurante Taquera in Tulum (right)

With a background in biology and geology, French author, cave diver, naturalist guide and tour operator Pierre Constant is a widely published photojournalist and underwater photographer. Please visit: ***calaolifestyle.com****.*



Edited by
Rosemary E. Lunn
and Matthew Meier

POINT & CLICK ON BOLD LINKS

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Equipment

Aqualung i330R

The i330R is a rechargeable, full colour wrist computer with Bluetooth connectivity and four dive modes, including three nitrox mixes. Easy to read, with an intuitive two-button menu system, the i330R comes with a rugged Nato strap for added security and durability. **Aqualung.com**

Wear a net

Bracenet states they are now selling ecologically produced white t-shirts that comply with the highest social, ethical and environmental standards. (The t-shirts are certified with the EU Ecolabel). The Tasman Sea shirt is made from 100% Fairtrade certified organic cotton, and features the Bracenet logo and "Save The Seas. Wear A Net" slogan on the sleeve. The female cut is somewhat fitted at the waist, whilst the male shirt is a little fitted at the shoulders and sleeves. There are five female sizes (XS, S, M, L, XL) and four male sizes (S, M, L, XL). Each shirt incorporates a piece of ghost net at the hem. Bracenet recommends that this is removed before washing, to reduce the possibility of adding microsplastics to our water supply. **Bracenet.net**

Fin fashion

Oceanic has brought a fresh new palette of bright, dynamic colours to its Accel fins. The high-stretch heel straps are also available in different colours. With a maximum length of 21in (~53cm) and weight of 3lb (1.36kg), Accel fins are relatively compact and lightweight. The manufacturer recommends them for all-around use. **Oceanicworldwide.com**

Atmos Mission One

The Mission One is a great mid-priced watch-style dive computer, designed for scuba and freediving. Apparently the user interface is intuitive, and it has an easy-to-use menu. It has four modes—air, nitrox (21% to 40%), freediving and gauge—and runs the Bühlmann ZHL-16c (GF configurable) model. This elegant feature-rich computer has a clear, uncluttered screen and a highly visible, easy-to-read 1.2" Hi-Res colour display. It benefits from a digital compass, and an integrated constant bright backlight (pretty much essential when diving in low viz / low light conditions). It has three alerts: audible, vibrating and visual (flashing displays). The rechargeable Mission One has a depth rating of 100m (328ft), and is capable of storing 100 dives. You can download the dive log via the app and a USB connection. **Atmos.app**

Kevlar Gloves

Kevlar gloves are not a gimmick. They are a useful solution for divers who require durable hand protection that does not compromise dexterity or grip. The latest Kevlar gloves to hit dive stores are from Fourth Element. They come in six sizes—XS, S, M, L, XL, XXL—and benefit from glued, blind-stitched and fused seams. The British manufacturer states its 5mm Hydrolock gloves "combine 4mm Kevlar reinforced fabric across the palm, fingertips and thumb, with 5mm stretch neoprene across the back of the hand. This produces a remarkably comfortable glove, perfected over several months with feedback from our team divers." **FourthElement.com**

Nanight Tech 2

Divers seeking an economical light might want to check out the Swedish manufacturer Nanight. Its Tech 2 model has been designed to be a budget canister light. The diver has the option of either using six nickel-metal hydride rechargeable batteries (Ni-MH), generating 1,500 Lumen, or upgrading to a Li-ion (lithium-ion) rechargeable battery pack that will give you 4,000 Lumen. Nanight indicates that there are four power settings. Depending on which battery solution divers use, they can expect a five to nine-hour burn time on the lowest setting. The light system weighs in at 500g (1.1 lb) without batteries and comes with a soft Goodman handle. Divers are able to upgrade to a hard carbon or aluminium Goodman handle if they wish. **Nanight.se**

Just Like Riding a Bike
— *Diving After a Break*

G SYMES/ PHOTO ILLUSTRATION COMPILED WITH PIXABAY IMAGES

Text by Simon Pridmore

Getting back into diving after a break is something a lot of us will be doing soon, as pandemic restrictions lift. At least, we hope so. This is the story of one diver's experience of returning to the sport—although, in his case, he had been out of the water for 20 years!

Jim first learnt to dive in his twenties. He then went to live on a tropical island for a couple of years and spent most of his weekends scuba diving. He did some technical diving courses and made a couple of long dive trips to exotic dive destinations. He was a diver and could not imagine ever not being a diver.

Then, life and work responsibilities intervened. He became a father and the primary wage earner, and those roles took priority. He no longer had time to dive. His equipment was packed away, but each time the family moved house, it came with them. Jim was still a diver after all. He did not dive anymore, but one day he would.

Twenty years later, his work/leisure balance had changed again and, out of the blue, a friend from his old diving days contacted him.

"Hey Jim," he said, "we are heading out to do some diving in northeastern Indonesia in a few months' time. Do you want to join us?"

Jim asked if he could think about it. This was diving in a remote destination. They would be doing over 30 dives in a 10-day trip. It had been two decades since he had been in the water.

Would he still remember how to dive? Would his old equipment hold up? Might the diving be too challenging for him? Would the other divers all be experts? Would he hold them back or make a fool of himself?

On the other hand, this was a great chance to get back into a sport he had loved. If he did not seize the opportunity now, maybe he would never dive again, and it would always just be something he used to do.

He called his friend back.

"I'm in!"

Getting ready

He dug his gear out of the cupboard. It all looked in good shape, but he thought he had better take it in to a local dive centre and get it looked at by experts. While he was there, he asked if he could do a scuba refresher, to remind himself of the basic skills.

The refresher went well and his equipment was tested and passed as fit for purpose once a few o-rings had been replaced. The only casualty was his mask. The rubber had deteriorated over the years, and it leaked the moment he put his face in the water. He needed a new one. His computer did not look out-of-date, compared to the new models on display in the shop, which surprised him. But he compared his sorry-looking old wetsuit with the ones hanging on the rack and decided that a new suit might be a smart investment.

ENRICO STROCCHI / FLICKR / CC BY-SA 2.0

The trip

After four flights and 24 hours either in the air or in airport transit, he met up with his old friend and their fellow divers in Sorong, the gateway to the diving Disneyland of Raja Ampat. The divemaster watched them all unpack their gear and handed out forms. Here was the point at which Jim would have to reveal his lack of recent experience. He wondered if he would be put on some sort of special watch or separated from the group, at least at the beginning.

The divemaster did not seem to find Jim's diving resume at all unusual, however. He just commented that there had been a "bit of a gap" since Jim's last dive but seemed very happy to hear that Jim had done a recent refresher. They discussed weighting and the divemaster recommended that Jim wear a little more than he had carried on his last dive all those years ago, to compensate for the new suit, an understandable anxiety and any additional "bioprene" he might have taken on over the years.

Jim immediately felt accepted and comfortable. He was not being treated like a freak or an outsider. He listened in on other divers' "interviews" and they were being asked very similar questions. Even divers with much more recent experience were uncertain about how much weight they needed.

Day One

On Day One, Jim back-rolled into his first dive of the day, deflated his BCD and exhaled. Nothing happened. He found himself stranded alone on the surface. Everyone else was gone. He dipped his head and looked down. There they all were, dropping down effortlessly to the seabed.

Dammit! His earlier fears that he would not be able to do this thing returned. Fortunately, he was not completely alone. The crewman had manoeuvred the tender boat over and was standing above him, holding two dive weights out. He handed them to Jim.

"One in each pocket. You'll be OK."

Jim did as instructed, looked up at the crewman, gave him an OK signal and a thumbs-down—he did remember some of the etiquette—and made another attempt to descend. Fins pointing down, left arm in the air, thumb on the deflator button. He took a deep breath from his regulator, then exhaled fully.

And down he went. Success! A little too much success, in fact. He was dropping like a brick. He felt pressure in his

GRACE COURBIS / FLICKR / CC BY 2.0

ears and the old instincts just kicked in. He equalised and added a little air to his BCD to reduce his descent speed. Then he looked down, found his group just below him, exchanged an OK signal with the guide and then just followed along.

After the dive, there was the usual banter.

"Good dive?"

"Great dive!"

"So many fish!"

Nobody mentioned Jim's false start; indeed, he got the impression that the guide was the only one who had noticed. The others had just been focussed on themselves. All Jim could think was, "What was I worried about?" and "Why did I wait so long?"

Air consumption

He had run low on air before the planned hour was up but one of his fellow divers had run low on air too, so they had ascended together. Even with an almost empty cylinder, he still had plenty of air in his BCD during the safety stop, which he suspected was a sign that he was now carrying too much weight. Before the next dive, he removed one of the extra weights he had been given and managed to descend without any difficulty… and not so fast this time.

Throughout the day, he found he still used up his air faster than the others but tried to compensate for this and extend his dive time, for example, by staying a little shallower when they were swimming along a reef wall.

That evening, he was flicking through a dive magazine, and he came across an article entitled "The Art of Conservation." He read it and followed the advice. Very soon, his air consumption issues were a thing of the past, and he was coming up at the end of a dive together with the other divers in his group and still with plenty of air in his cylinder.

Gear failure

As those of you familiar with Murphy's Law might expect, just as Jim began to feel completely comfortable, disaster struck. He surfaced at the end of a night dive, pressed his inflator button and all he heard was air escaping past his ear. He could not make himself positively buoyant and had to kick hard to keep his head above water. Fortunately, the tender boat was nearby, the crewman saw him in difficulty and told him to pass up his weight belt. Once he got rid of that, Jim found he could float easily even without any air in his BCD.

Back on the liveaboard, he found that the shoulder valve on his BCD had cracked. That was where all the air was escaping from. At first, he thought that it was the hard plastic fitting that had broken but, as he picked away at the crack, the "plastic" started flaking away in his hand. What he had taken for plastic was in fact a fat layer of glue that held the fitting in place and was now disintegrating.

The passage of time had taken its toll on his old BCD, and it was now unusable. It could be repaired, but not on the boat. So, Jim borrowed one of the boat's rental BCDs. This, of course, meant that he had to start from scratch again as far as getting his weighting right was concerned. But it did not take him long to get it sorted out.

After every dive, he would return to the boat, smiling from ear to ear. His old friend came up to him after one particularly outstanding dive.

"So, how's it going, then?"

"Just like riding a bike," said Jim. ■

Simon Pridmore is the author of the international bestsellers Scuba Confidential: An Insider's Guide to Becoming a Better Diver, Scuba Professional: Insights into Sport Diver Training & Operations *and* Scuba Fundamental: Start Diving the Right Way. *He is also the co-author of the* Diving & Snorkeling Guide to Bali *and the* Diving & Snorkeling Guide to Raja Ampat & Northeast Indonesia. *His most recent published books include* The Diver Who Fell From The Sky, Dive into Taiwan, Scuba Exceptional: Become the Best Diver You Can Be, Scuba Physiological: Think You Know All About Scuba Medicine? Think Again! *and the* Dining with Divers *series of cookbooks. For more information, see his website at:* ***SimonPridmore.com***.

While Bret Gilliam worked with great white sharks off Guadalupe Island in Mexico, this 18ft, one-ton female swam up to him and posed less than three feet away, while he was outside the cage.

Interview with Bret Gilliam *—Trailblazer & Founder of TDI*

BRET GILLIAM

Interview by Andrea Murdock Alpini
Photos courtesy of Bret Gilliam

If you love scuba diving, deep dark waters, decompression procedures and mixed gas theory, you must have heard the name many times: Bret Gilliam, a revolutionary trailblazer in the dive world. Over the past few decades, he has changed the way scuba diving is practiced.

PHOTO COURTESY OF BRET GILLIAM

Bret Gilliam being inducted into the AUAS Diving Hall of Fame in 2012

Bret Gilliam is a kind of living anecdote, a man with a thousand dive stories. Recently, I had the chance to sit and talk with him and hear some of his tales. We discussed hyperbaric medicine, diving records, the scuba industry and the future of closed circuit rebreathers (CCR) as well as open circuit. What follows is the condensed version of the interview. For the full-length version, please go to: **xray-mag.com/content/interview-bret-gilliam-founder-tdi**

Nothing appears as it really is. Gilliam is a kaleidoscope; getting inside his point of view requires time. So, take a deep breath and plunge into the mystic world that is Gilliam's life, in which submarines, sea vessels, humpback whales and ocean exploration merge into one.

profile

COURTESY OF BRET GILLIAM

PHOTO COURTESY OF BRET GILLIAM

Bret Gilliam and his father Gill diving in the Bahamas in 1959 (far left). He started diving in Key West at the age of eight—it set the path for his entire career; Dr Mendel Petersen of the Smithsonian Institution, George Tyson, Dr Alan Albright, Bret Gilliam and Dave Coston excavating the wreck of the *Santa Monica* off the island of St John in 1972, with their early proton magnetometer (left); Gilliam operating a rec-ompression chamber for NOAA in 1988 (right)

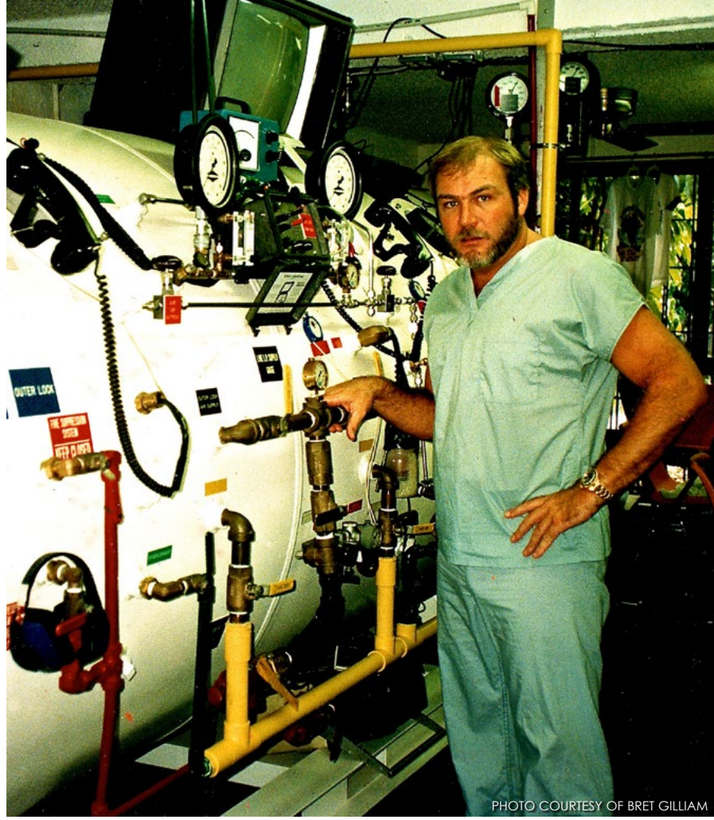


PHOTO COURTESY OF BRET GILLIAM

Background

With a professional career that now spans over five decades, Gilliam has been involved in the dive industry since the early '70s. Since he began diving in 1959, he has logged over 19,000 dives around the world. In addition to founding dive training agencies such as TDI, SDI and ERDI and dive magazines such as *Scuba Times*, *Deep Tech* and *Fathoms*, Gilliam's background includes scientific expeditions, military/commercial projects, operation of hyperbaric dive treatment facilities, liveaboards and cruise ships, dive store and resort operations, equipment manufacturing (UWATEC), and filming projects for feature films, documentaries and television. He is widely recognized as one of the dive world's most successful entrepreneurs.

His papers have been published by the International Society of Aquatic Medicine (ISAM), Divers Alert Network (DAN), Undersea and Hyperbaric Medical Society (UHMS), National Oceanic and Atmospheric Administration (NOAA), and South Pacific Underwater Medicine Society (SPUMS). He was also a contributing author and editor on the topic of "Diving Emergency Medicine" in the reference textbook, *Prehospital Trauma Life Support*, published by Mosby Lifeline, used by physicians, nurses, DMTs, EMTs and paramedics.

Gilliam's awards include NAUI's Outstanding Contribution to Diving Award (twice) and Beneath the Sea's Diver of the Year, as well as international recognition for his film work and photography. He is listed in the *Who's Who in Scuba Diving*, published by Best Publishing, and was inducted into the internationally prestigious Explorers Club as a "Fellow National" in 1993. Gilliam has twice held the world record for deep diving on scuba and has been a leader in the growing field of technical diving, electronic dive computers, rebreathers and other technological advances. He was inducted into the Diving Hall of Fame by the Academy of Underwater Arts and Sciences (AUAS) in 2012 as a recipient of the NOGI Award. Currently, he serves as a consultant to businesses in the dive industry as well as a litigation strategist and diving/maritime expert witness.

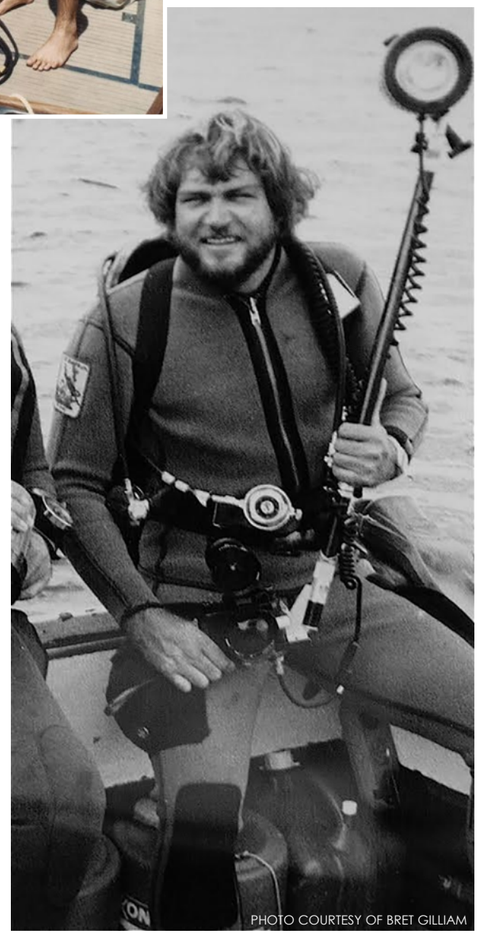


PHOTO COURTESY OF BRET GILLIAM

Bret Gilliam on a film project for *National Geographic* in the Virgin Islands in 1977

AMA: What was the dive that changed your way of seeing scuba diving? I mean, a dive that was like an epiphany, a dive that changed your point of view in technical matters...

BG: I began diving at age eight in 1959 in Key West, Florida. My father had introduced me to snorkeling and we watched the first television episodes of *Sea Hunt* that year. That show inspired me to take up diving, and my father allowed me to sign up for some of the first dive training offered in that era. I started my first business in 1961 at age ten, trapping fish to sell to the Key West Aquarium and to several others. I was making good money with my fish sales, and my little company was successful. That launched my initial involvement in diving, and I was hooked.

AMA: Can you describe the golden era of scuba diving, which you lived through? Was it a heritage?

BG: The dive industry was constantly evolving, and some incredible growth began in the early '70s. Professional dive facilities were created, as well as modern dive vessels, expanded certification training, astounding advances in equipment design, exotic dive travel… industry growth was superb. We began to see the decline in the late '90s as younger participants were not as attracted to diving as a sport. Since about 2003, we have seen the dive industry decline.

The leadership in the industry has also suffered, and with the current state of financial decline and the effects of the pandemic, I do not have a good feeling about the future. I sold the last of my dive companies in 2005, and it was the best decision I made. I am still involved in high-end book publishing and legal consulting. Many of us from the era developed very sophisticated and efficient business models in all segments, but many lacked the entrepreneurial skills and vision to achieve long-term success. When I sold the last of my companies, the aggregate value was about US$80 million. That's almost beyond belief today.

AMA: As a captain, you have been merged with the sea, from the surface to its deepest points. What does the ocean or the sea represent for you?

BG: From my earliest experiences in life as a kid, the ocean has drawn me in. I learned to swim before I could walk and became an experienced snorkeler as a

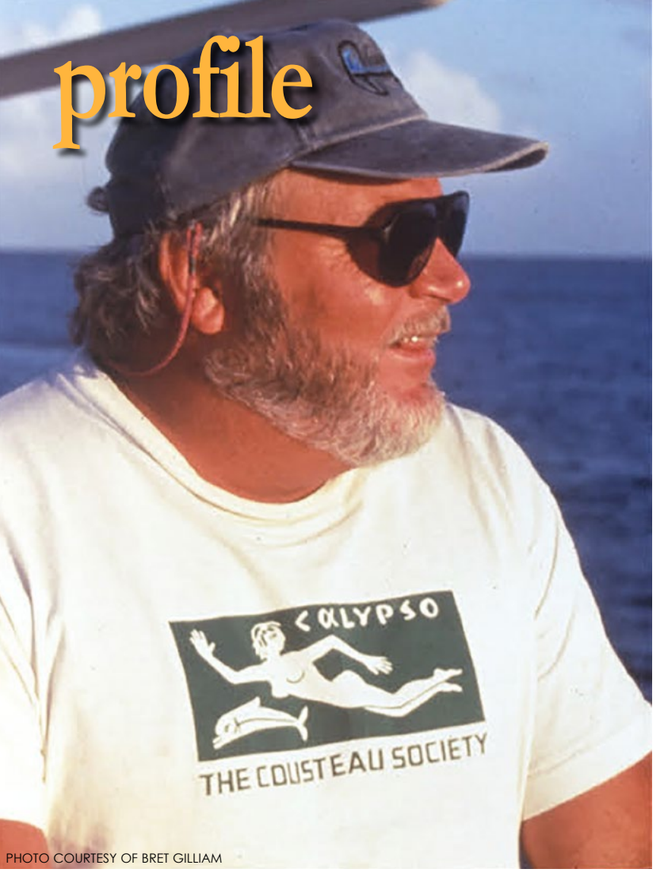


PHOTO COURTESY OF BRET GILLIAM

Bret Gilliam aboard the *Calypso*, filming with Jacques-Yves Cousteau (left)

PHOTO COURTESY OF BRET GILLIAM

Bret Gilliam, Dick Bonin (founder of Scubapro) and Bill Walker outside the first location for V.I. Divers, Ltd in 1974

four-year-old. My father let me take scuba lessons at age eight in 1959. It changed my whole life. The ocean is my natural environment and my home. We face challenges with climate change, pollution, destruction of corals and marine life, etc. I hope the world can wake up to the grim reality that we face and take the necessary steps to save the oceans.

AMA: If you look to the past, can you describe the main steps in your scuba diving career and research?

BG: For 12 years, I was a sport diver doing all sorts of underwater jobs… cleaning vessel bottoms, taking out divers and snorkelers, fish collecting for the aquariums, photography, etc. I started my professional diving career in January 1971, working with the US Navy on their deep diving projects in the Virgin Islands and handling the operation of the recompression chamber. After the Navy project, I moved into commercial diving and later became the manager of their company. I was lucky enough to work with some of the best professionals in dive research, including early work on decompression algorithms, physiology, dive treatments, saturation habitats, deep submersibles, and a seemingly endless list of other projects. For the last 50 years, my career path has been professional diving and vessel operations worldwide.

AMA: Who was the most influential person you have met in scuba diving?

BG: Dick Bonin was an ex-Navy diver and then went on to found Scubapro. His insight, knowledge, expertise and wonderful personality bonded us. His mentorship was invaluable. We both made a fortune in diving. We were friends and colleagues for nearly five decades—a true pioneer, and I was so honored to know him.

AMA: Becoming a member of the Explorers Club and being inducted into the AUAS Diving Hall of Fame are great honors… When did you receive them?

BG: I was inducted into the Explorers Club as a Fellow National in 1993, its highest honor. I was also voted into the AUAS Diving Hall of Fame in 2012 as a recipient of their NOGI Award. I'm truly grateful.

AMA: Exploration, as a pursuit, was once just for a select few, now the word is sometimes abused in conversation. How do you interpret this concept?

BG: I have been involved in worldwide exploration for decades and had the privilege of working with so many amazing people. I have been a member of the Explorers Club for nearly 30 years and greatly admire the organization's contributions. But there are a lot of folks out there that do not actually meet the criteria. It seems that many are more concerned with sewing a patch on their jacket or pumping up their supposed qualifications...

AMA: What are the "must-have" books for a dive library?

BG: *The Silent World* by Cousteau, anything by Stan Waterman, *Sea Change* by Sylvia Earle, *Fifty Fathoms* by Blancpain, *Diving with Safety* by Bev Morgan, and *Silver Seas* by Ernie Brooks.

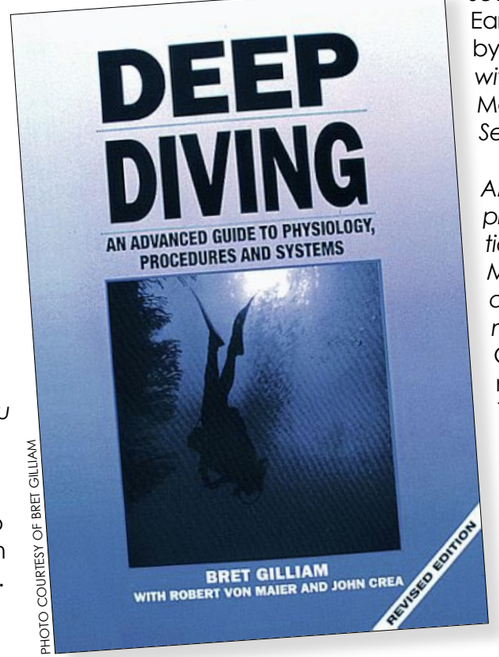


PHOTO COURTESY OF BRET GILLIAM

Deep Diving, by Bret Gilliam, published by UNKNO

AMA: What was your professional relationship with Tom Mount like? Can you describe how the masterpiece, Mixed Gas Diving: The Ultimate Challenge for Technical Diving, *was born?*

BG: Tom and I met in 1972 and immediately established a close relationship. Tom was one of the most skilled divers I had ever met, and we had so much in common. Ken Loyst of Watersport Publishing asked me to do a sequel to *Deep Diving*, and that was a bestseller, so we collaborated on *Mixed Gas Diving*.

AMA: When did you get the idea to study the physiology of oxygen and its effects in scuba diving theory?

BG: It was crucial to our survival to be able to manage the extreme depths we worked in and to have a full understanding of the potential hazards. There are many aspects of diving physiology that were complicated and presented special challenges. The management of the oxygen exposure and issues of oxygen toxicity were at the top of our list of hazards.

I was mentored by a diving medical officer who brought me in to run the Navy recompression chamber on the ship. This led to a six-month period with him covering virtually all foreseeable contingencies.

Oxygen was just one of our daily considerations in dive planning. Back in 1971, 50 years ago, we had to deal with so many subjects, which directly affected our dives, that it really concerned the ship's officers. But we used our practical experience and accessed medical references to make certain that we could deal with narcosis, oxygen toxicity, HPNS, work of breathing from the regulators at extreme depths and so many other issues.

Again, back in that era, we routinely worked deep on air, and our standard PO_2 limit was 2.0; that was modified to $1.6PO_2$ in the '70s. But we needed to get deeper and switched to heliox below 300ft. Overall, we were completely comfortable with the dive plans we created, and the Navy was extremely pleased that we could get the filming done at such extreme depths.

There is no question that our project was extremely high priority due to the Cold War tactics of submarine operations. In essence, we were considered expendable. So, we concentrated on adapting our dive plans, equipment, decompression procedures and contingency planning to stay alive. We finished the project way ahead of schedule, and I was released from further military service. Fascinating times!

AMA: How have human factors influenced your technical thoughts on deep diving?

BG: The underlying science and physiol-


PHOTO COURTESY OF BRET GILLIAM

Dick Rutkowski (left) developed the first nitrox training courses when he founded IANTD. Tom Mount, Billy Deans and Bret Gilliam were all founding partners; The custom dive tables created for Gilliam by Randy Bohrer when they started *The Deep* project in 1989 (right)

Rebreathers have a place in many areas of diving, but they also are expensive for most divers, require extensive training and practical experience, and many specialty manufacturers have had trouble staying in business. I am all for innovations and technological advancements. But there has been a high incident rate for both injuries and fatalities within certain technical diving segments, and this needs to be recognized and resolved.

AMA: Hyperbaric medicine has grown up fast during the past few decades. You have been involved in this field for 50 years. Can you give us an overview about how hyperbaric medicine has influenced scuba diving from the past to the present day? How do you see the future of this field?

BG: The research and development of procedures and protocols in the treatment of divers has been extraordinary. And the knowledge and expertise of the hyperbaric medical experts have been equally distinctive. Working with guys like Dr Tom Neuman, Dr Paul Cianci, Dr Bill Shane, Dick Rutkowski and others was so valuable. I think so much has been accomplished that a new level of excellence has been achieved.

What worries me today is that so many hyperbaric facilities and field chambers have been shut down for financial reasons. The future is a bit unknown and how the diving medical treatments will emerge with far fewer hyperbaric facilities is a bit unnerving.

AMA: What does "freedom" stand for you—in relation to scuba diving practice, of course?

BG: My entire professional career was in diving, and I owned my companies, so I did not really have to answer to anyone. I tried to use the best judgement I could for training, safety, boat operations, etc, and allowed my diving customers the freedom to make their own decisions for diving based on experience.

Many dive operations were very restrictive and put rules in place that made no sense to well-experienced divers. My companies were different. We allowed decompression dives. We had no limits on depth. We allowed our diving customers complete independence based on our evaluations of their training and experience.

Many of our customers did three to five dives per day in an era when most divers were limited to one or two.

The Cayman Islands restricted all dives to 100ft or less—no deco, no nitrox, no dive computers, and your second dive could not be deeper than 50ft. All divers were herded into groups with no independent diving allowed at all. It did not make for a positive customer experience for most divers, and it drove thousands of divers to abandon the Caymans and other areas.

Freedom is good if such procedures and practices are well thought out and practical. It worked well for me and my companies. When I founded Ocean Quest International in 1988, we averaged nearly 1,000 dives a day with our customers. That's over 4,000 dives a week. It was the largest dive operation in world history.

PHOTO COURTESY OF BRET GILLIAM

Gilliam's Proprietary Tables

First edition: Randy Bohrer to Bret Gilliam's specifications to 500 fsw. Produced in 1989.

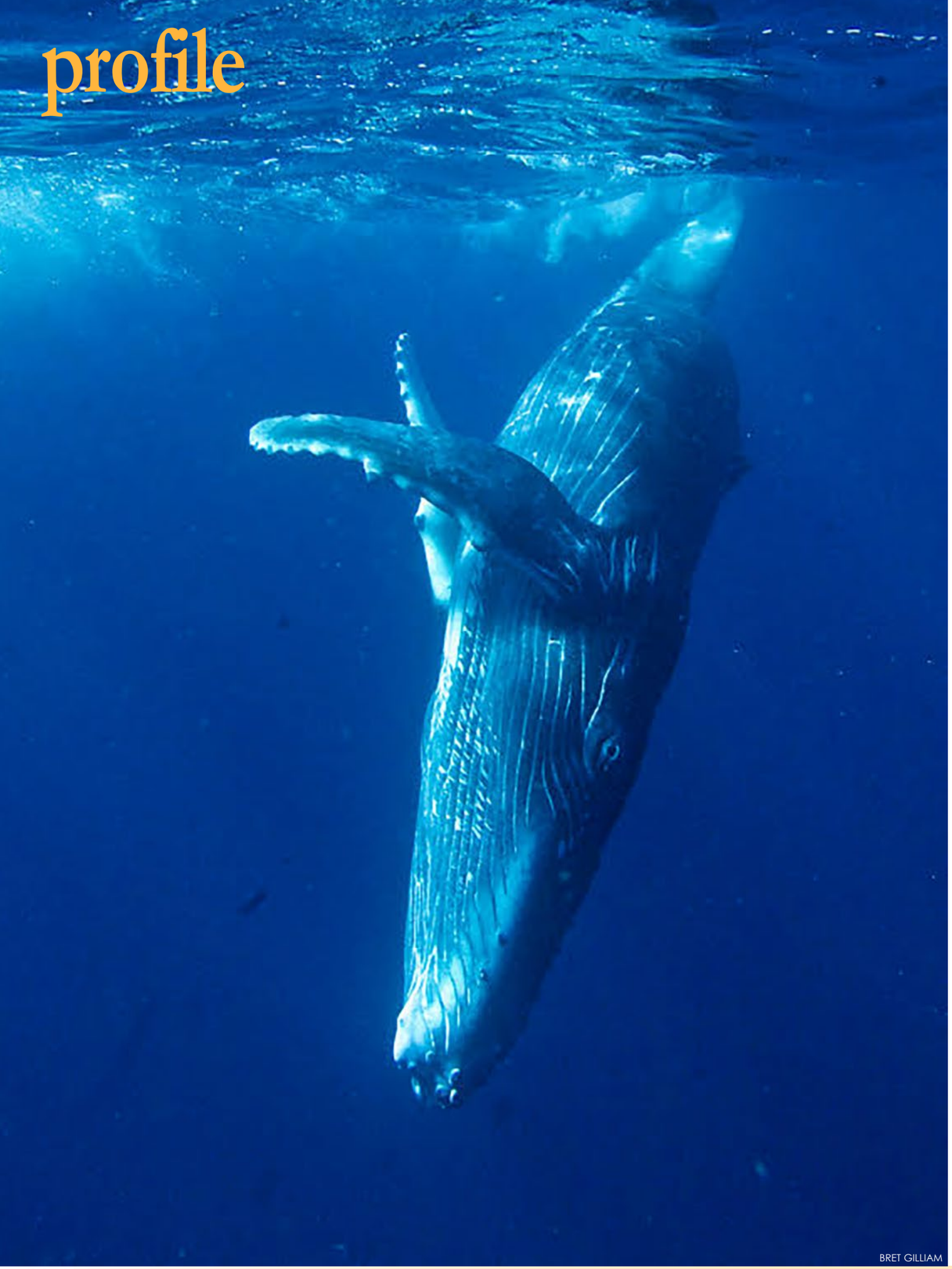
Depth (fsw)	Decompression Stop (ft./min.)											
	120	110	100	90	80	70	60	50	40	30	20	10	Total
300								1	3	4	8	13	29
350							1	3	4	7	10	20	45
400						2	3	3	7	8	14	29	66
450					2	3	3	6	7	11	19	42	93
500			1	2	3	3	6	5	10	15	26	57	128

PHOTO COURTESY OF BRET GILLIAM

Stan Waterman, Al Giddings and Chuck Nicklin on location filming *The Deep* in 1976

AMA: Al Giddings was the only American scuba diver on board the first Italian expedition on the Andrea Doria *wreck. What was the professional relationship you had with him?*

BG: Al and I met in 1971, and I became the distributor of his underwater photog-



BRET GILLIAM

In this photo taken by Bret Gilliam, a humpback whale in Tonga comes over to visit him.

Bret Gilliam surfacing from a 2,500ft dive in a deep submersible in 1992

raphy line in the Caribbean called Giddings-Felgen. Great products! Then, I did some early movie work with him before we started work on *The Deep* in 1976.

The list of his movies that we worked on is amazing. Al was THE go-to underwater film guy, with such hits as *The Deep, The Abyss, Titanic, Never Say Never Again, True Lies, The River Wild*, and scores of documentaries and television series, including the ABC *Ocean Quest* series in the mid-1980s.

Al Giddings was editing the final underwater footage for *Titanic*, which would be released a few months later in 1997. We ended up at dinner with his neighbor actor Dennis Quaid that night at Al's estate in Montana. Amazing man and a wonderful mentor!

AMA: If you had one choice, what would be your favorite dive?

BG: I started working with whales in the mid-'60s and have been emotionally attached to them ever since. My favorites are humpbacks. They have a friendly gregarious nature, and I love filming them. I freedive, holding my breath, for almost all dives. We found out, decades ago, that humpbacks do not like exhaust bubbles and simply disappear if you come anywhere near them.

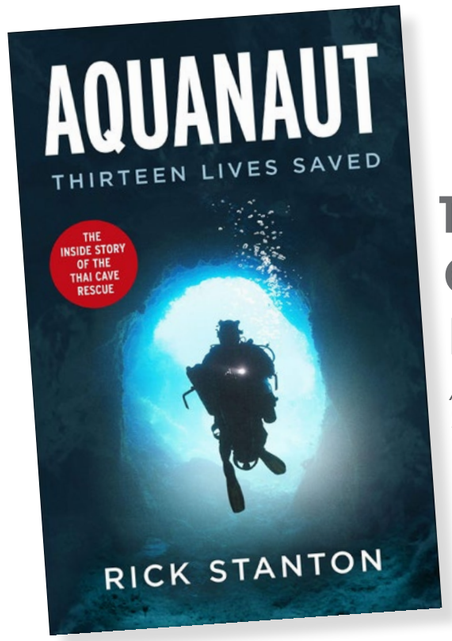
But the whales seem thoroughly happy if I simply freedive with them. I can routinely hold my breath between three and four minutes and get down to 150ft or so. The whales get curious as to why a human is so deep and come over to check me out. I have been truly blessed over my life to spend so much time with whales all over the world.

"Have you ever seen the rain?" Getting the correct answer to this question is not easy—just ask Alice in Wonderland if you wish. By the way, have you ever meditated on the real meaning of the question? If you want to understand the deeper meaning beyond the words, continue reading the extended version of this interview at: **xray-mag.com/content/interview-bret-gilliam-founder-tdi**. *If not, take the "left hand pill" (like the choice Neo faced in the film,* The Matrix*) and you will immediately step out of the "reality" beneath the words.* ■

PHOTO COURTESY OF BRET GILLIAM

Based in Italy, author Andrea Murdock Alpini is a technical diving instructor for TDI, CMAS and ADIP. Diving since 1997, he is a professional diver focused on advanced trimix deep diving, log dives with open circuit, decompression studies, and research on wrecks, mines and caves. Diving uncommon spots and arranging dive expeditions, he shoots footage of wrecks and writes presentations for conferences and articles for dive publications and websites such as ScubaPortal, Relitti in Liguria, Nautica Report, SUB Underwater Magazine, ScubaZone, Ocean4Future *and* InDepth. *He is also a member of the Historical Diving Society Italy (HDSI), and holds a master's degree in architecture and an MBA in economics of arts. He is the founder of PHY Diving Equipment (***phidiving.com***), which specializes in undergarments for diving, as well as drysuits, hoods and tools for cave and wreck diving. Among other wrecks, he has dived the Scapa Flow wrecks heritage, Malin Head's wrecks and the HMHS Britannic (-118m), Fw58C (-110m), SS Nina (-115m), Motonave Viminale (-108m), SS Marsala (-105m), UJ-2208 (-107m) and the submarine U-455 (-119m)—always on an open circuit system. His first book,* Deep Blue, *about scuba diving exploration (in Italian) was released in January 2020 (see* ***amazon.it***). *For more information on courses, expeditions and dived wrecks, visit:* ***wreckdiving.it***.

media

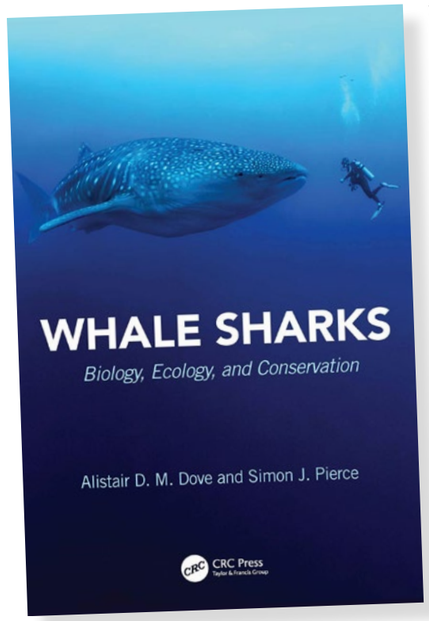


Thai Cave Rescue

Aquanaut: A Life Beneath The Surface—The Inside Story of the Thai Cave Rescue, by Rick Stanton

In June 2018, 12 boys and their football coach were trapped in the Tham Luang Cave in Thailand by rising floodwater. Rescue and military officials were unable to get them out due to the unique cave environment. Only three men had the expertise to get them out. This book has been written by one of them, expert cave diver Rick Stanton. Writing in a straightforward, engaging style, Stanton gives a unique behind-the-scenes perspective on the rescue operations, as well as an insight into a life lived without compromise.

Publisher: Michael Joseph
Date: 10 June 2021
Hardcover: 448 pages
ISBN-10: 0241421268
ISBN-13: 978-0241421260

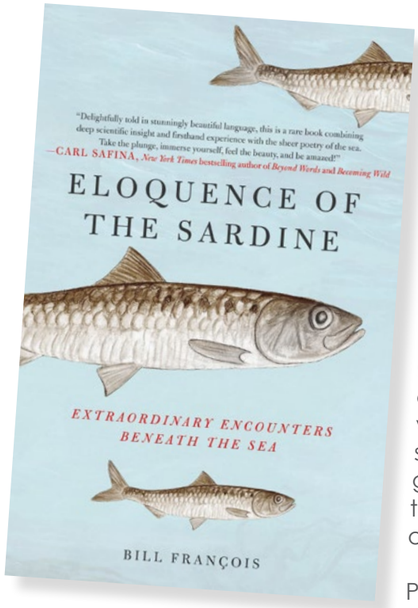


Whale Sharks

Whale Sharks: Biology, Ecology, and Conservation, edited by Alistair D.M. Dove and Simon J. Pierce

This book is the first definitive compilation of discussions on the whale shark, the world's largest fish. Written by international experts in the field of whale shark biology, ecology and conservation, topics covered include satellite-linked tags, genetic sequencing, underwater ultrasound units, etc. With the species listed by the IUCN as "Endangered" and facing numerous threats from human activities, the editors hope that this compilation makes it easier for researchers, conservationists and resource managers to fill some of the remaining knowledge gaps, and for readers in general to be awed by these gentle ocean giants.

Publisher: CRC Press
Date: 24 August 2021
Hardcover: 352 pages
ISBN-10: 1032049405
ISBN-13: 978-1032049403



Marine Life

Eloquence of the Sardine: Extraordinary Encounters Beneath the Sea, by Bill François, Antony Shugaar (Translator)

This book takes us on a poetic journey beneath the waves, visiting with musical whales, immortal eels, singing seahorses and chatting lobsters. Amidst the glow of fluorescent jellyfish, alongside first-hand scientific insights and humour, readers are taken into a dreamlike underwater world filled with ancient myths, modern science and storytelling, all woven together into a cohesive oratorical tapestry that celebrates the beauty and essence of the underwater realm.

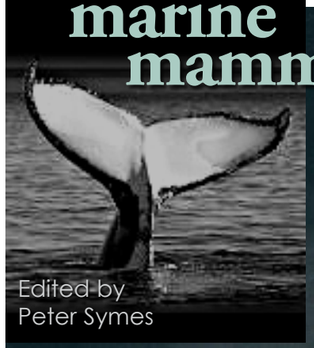
Publisher: St. Martin's Press
Date: 17 August 2021
Hardcover: 192 pages
ISBN-10: 1250272432
ISBN-13: 978-1250272430

Thai Cave Rescue

Thirteen Lessons that Saved Thirteen Lives: The Thai Cave Rescue, by John Volanthen

Written by one of the two men who first discovered the boys and their coach in the Thai Cave Rescue in 2018, John Volanthen relates the happenings that took place behind the scenes as the rescue operations unfolded. Each of the thirteen chapters in this book focuses on a specific part of the rescue while at the same time imparting life lessons gleaned from Volanthen's past experiences and cave dives that can be applied to one's daily challenges.

Publisher: Aurum Press
Date: 13 July 2021
Hardcover: 304 pages
ISBN-10: 0711266093
ISBN-13: 978-0711266094



File photo: Blue whale (*Balaenoptera musculus*)

New population of pygmy blue whales discovered

A team of scientists from the University of New South Wales is confident they have discovered a new population of pygmy blue whales, the smallest subspecies of blue whales, in the Indian Ocean.

Pygmy blue whales are the smallest members of the blue whale family, but that is the only small thing about them; they can reach up to 24m long. Despite their enormous size, blue whales have been difficult to observe in the Southern Hemisphere as they live offshore and do not jump around like the humpback whales; thus, for some regions, their population structure, distribution and migration routes remain poorly understood. In particular, little is known about the blue whales in the northern Indian Ocean.

Fortunately, blue whales produce powerful and stereotyped songs, which prove an effective clue for monitoring their different "acoustic populations." Blue whales produce powerful and stereotyped songs, that they repeat in sequences for hours to days. Each blue whale population has a distinct vocal signature, which can be used to distinguish and monitor different "acoustic populations" or "acoustic groups."

Diversity of populations

It turns out the Indian Ocean has an incredible diversity of blue whale acoustic populations.

Until very recently, there were four recognized blue whale populations from two subspecies: the Antarctic blue whale (*B. m. intermedia*), that is believed to produce the same song across the Southern Hemisphere; and three acoustic populations of the pygmy blue whale (*B. m. brevicauda*).

The pygmy blue whale populations are distinguishable only acoustically; they do not display morphological differences and genetic data are sparse.

Lots of pygmy blue whales

"We've found a whole new group of pygmy blue whales right in the middle of the Indian Ocean," said UNSW Professor Tracey Rogers, marine ecologist and senior author of the study. "We don't know how many whales are in this group, but we suspect it's a lot by the enormous number of calls we hear."

The team named the newly found population "Chagos," after the archipelago they were detected nearby.

The discovery was made possible using data from the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), an organization that monitors international nuclear bomb testing.

Since 2002, the CTBTO have been using advanced underwater microphones (called "hydrophones") to detect soundwaves from potential nuclear bomb tests. The recordings, which pick up many other detailed ocean sounds, are available to scientists to use for their marine science research. ■

SOURCE: SCIENTIC REPORTS

Dolphin species that live together do not necessarily compete for food

Analysis of skin samples reveals how different species of toothed whales compete for prey and which foods they choose in each other's company.

It is difficult to actively study the food and food search behaviour of toothed whales. What we know historically is primarily derived from the stomach content of dead specimens.

To get around the problem of having to wait for dead animals to wash ashore, researchers took a closer look at so-called stable nitrogen isotopes of amino acids in small pieces of skin tissue from living sperm whales, orca, and eight dolphin species in the Southwestern part of the Atlantic Ocean, off the coast of Brazil.

A small part of the atoms like nitrogen (N) that occurs in every living cell, is a little bit heavier than the rest. As an animal ingests the nitrogen with its food, digestion (metabolism) separates the heavy atoms a tiny bit slower than the light ones, with the result that the heavy atoms are taken up into the body tissue of the animal more often than the light version. This pattern of uptake piles up: the higher an animal is in the food web, the more heavy N-atoms in its body tissue.

It was previously believed that there was a great overlap in food of three of the dolphin species. It turns out there is no overlap whatsoever.

The short-beaked common dolphin, *Delphinus delphis*, turns out to hunt at a different depth in shallow water, while the Atlantic spotted dolphin, *Stenella frontalis,* and the common bottlenose dolphin, *Tursiops truncatus*, hunt in waters up to depths of 500m. The latter two species that thus feed at the same depth have different prey. Apparently, the dolphin species have found a way to live together without competing for food. ■ SOURCE: ROYAL NETHERLANDS INSTITUTE FOR SEA RESEARCH

Sharing resources in a civilised manner? Sharks at Tiger Beach do not get into food fights but appear to wait patiently in line for their turn.

Sharks of different species take turns hunting

Scientists monitoring the behaviour of different species of coastal sharks found that they actually do their hunting in shifts as a way of maintaining a harmonious co-existence.

Niche partitioning of time, space or resources is considered the key to allowing the coexistence of competitor species, and particularly guilds of predators such as sharks.

However, the extent to which these processes occur in marine systems is poorly understood due to the difficulty in studying fine-scale movements and activity patterns in mobile underwater species.

To that end, scientists at Australia's Murdoch University used accelerometers to determine the activity patterns of six species of large free-ranging sharks in the waters of the Gulf of Mexico: blacktip sharks, bull sharks, sandbar sharks, great hammerhead sharks and scalloped hammerhead sharks.

The research, led by Dr Karissa Lear and Dr Adrian Gleiss at the Centre for Sustainable Aquatic Ecosystems, produced the first known example of marine predators partitioning resources by foraging at different times of the day.

"This is a relatively rare way of sharing resources in nature, but it could be more common than we think in understudied marine ecosystems," said Dr Lear.

Such temporal partitioning of resources is likely to be driven by a combination of physiological and morphological constraints of each species and behavioural mechanisms, including a species's potential for behavioural plasticity.

The larger or more dominant predators, including tiger sharks, bull sharks and great hammerhead sharks, may be active and forage during the times of day that best suit them physiologically. For example, hammerhead sharks (most active here at night) are known to have superior binocular vision compared to carcharhinid species, which may put them at an advantage in low-light environments, while tiger sharks (most active here during midday) have been proposed to use visual silhouettes of prey on the surface as a main foraging mechanism, requiring higher light levels. ■

SOURCES: PROCEEDINGS OF THE ROYAL SOCIETY B, MURDOCH UNIVERSITY

LARRY COHEN

Dealing with Floods

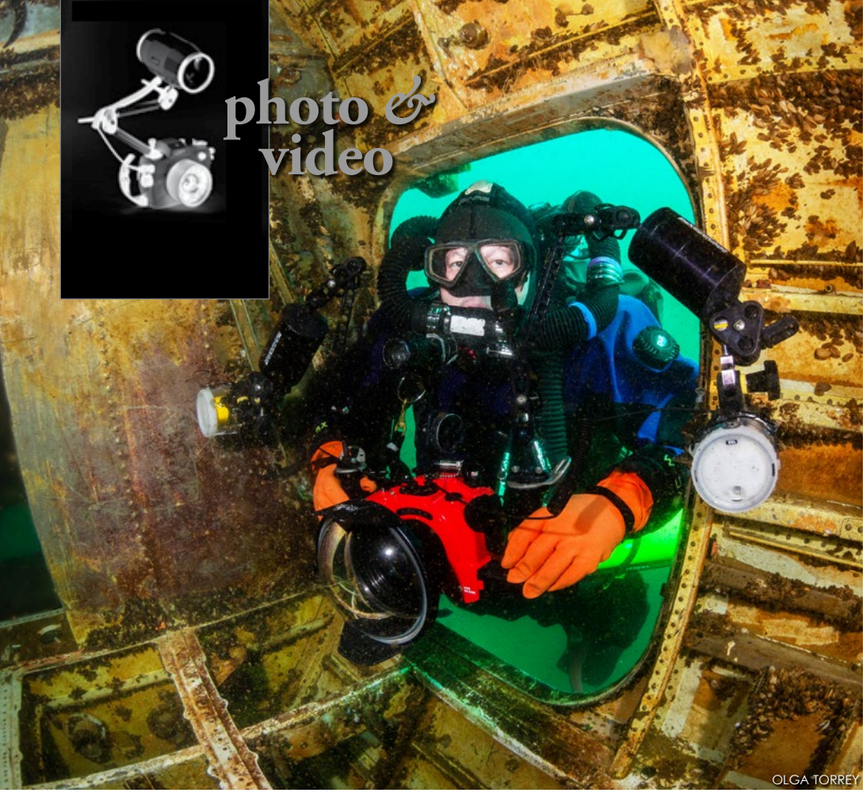
Text by Larry Cohen
Photos by Larry Cohen
and Olga Torrey

Flooding a camera and other underwater photo gear is a nightmare for all underwater image-makers. Unfortunately, if you work underwater long enough, at some point, you will experience the horror of a flood. Over the years, I have flooded a Nikonos V, a film camera, a housing, several strobes and some dive lights. I have also had minor floods on a few digital camera housings.

Our costly camera gear is kept dry by a cheap gasket called an O-ring. Underwater imaging gear manufacturers use O-rings composed of different materials and suggest that a specific kind of O-ring lube be used to keep the O-ring flexible, keeping it from drying out. Basic underwater photography training states that we need to check all O-rings for damage and dirt before entering the water. The O-rings need to be lightly greased with the correct lube. The lube can attract dirt, so you need to make sure the O-rings are clean after adding the lube. It is crucial to make sure the groove in which the O-ring sits is pristine.

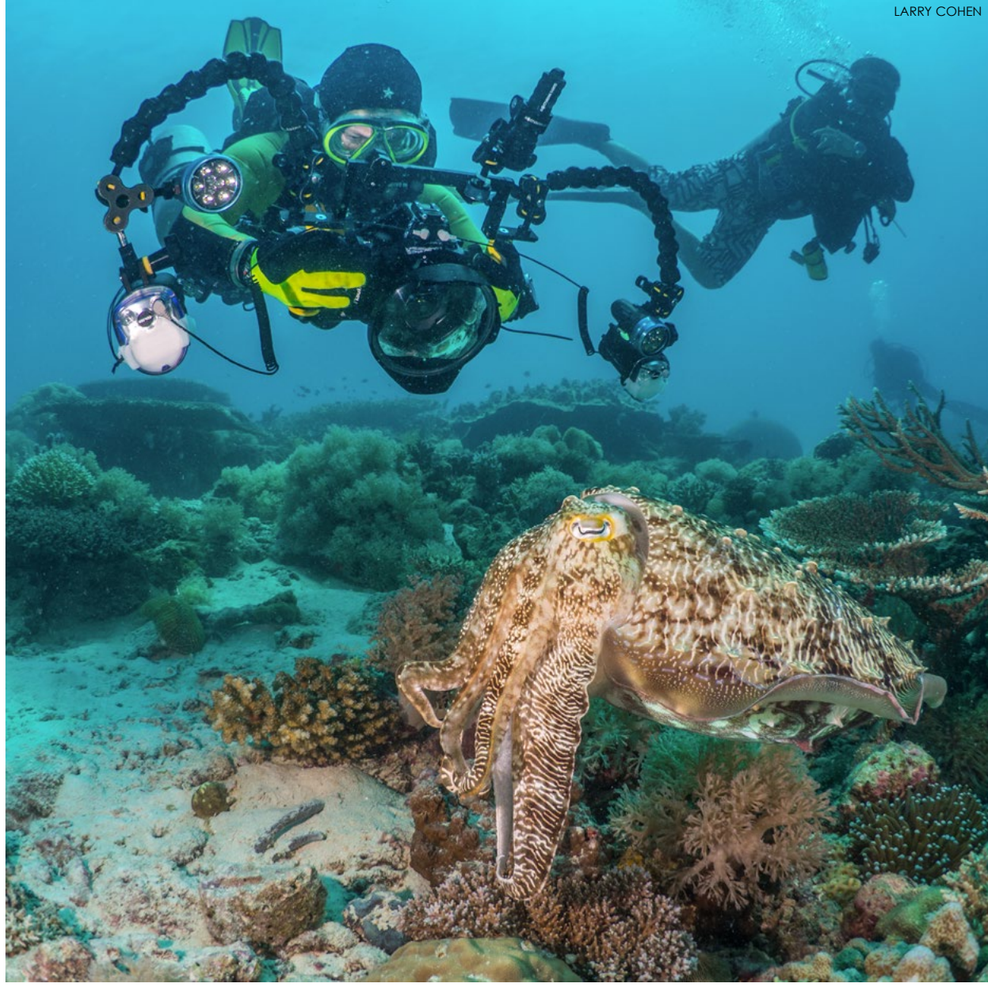
User error

In most cases, floods are caused by user error. Therefore, it is essential to take your time preparing your gear. Besides the O-rings, make sure the camera is sitting in the housing correctly. For example, a camera out of alignment in the housing can cause a leak. Strobes and video


OLGA TORREY

OLGA TORREY

Author Larry Cohen entering a shipwreck with a sealed housing (left); Vacuum and flood alarm inside the housing (right); Underwater photographer and dive buddy, Olga Torrey, with sealed housing, photographing a cuttlefish in Malaysia (far right)


LARRY COHEN

lights need to be checked; it is easy to forget to lock the battery door. Finally, never let anyone else prepare your gear or open and close your housing. Just like analyzing your breathing gas, this is your responsibility.

In the field

You have to consider the environment you are diving in. For example, if you are shore diving, sand could be a real problem. So, it is vital to pay special attention to ensure there is no sand on the O-ring or the channel the O-ring sits in. Also, O-rings and other gear can fail when you are in the field. So, it is essential to have tools, including small brushes, extra O-ring lube, and spare O-rings for all your gear. A captain I used to crew for used to say an O-ring cost US$15 in the camera store and US$150 on the boat!

Flood alarm

Many camera-housing manufacturers install a flood alarm. If a housing floods, the water connects two wires, and an audio alarm goes off. Most of the time, when you hear the warning, your gear is already damaged. I often thought that instead of a buzzer, the alarm should be a recording saying, "Your equipment is screwed!"

Vacuum pump

Nowadays, many housings have a vacuum test and alarm system. You use a pump to create a vacuum in the housing. If air enters the housing, so will water, and an alarm will warn you of the problem. Testing a housing for leaks before entering the water gives you a warm and fuzzy feeling. Also, it is fantastic to know for sure that the housing is sealed while still on the surface.

Murphy's Law

Murphy's Law states: If anything can go wrong, it will. So, even when you do everything right, floods can happen. Many professional cameras and lenses these days are weather-sealed, so these cameras have a better chance of surviving a flood. For this reason, if you are not using strobes, make sure you keep a cover on the hot shoe and sync ports. In addition, if the flood occurs in fresh water, there is less chance of corrosion. If the housing floods in salt water, rinse the inside of the housing in fresh water, dry it out with a paper towel and hairdryer. The bulkheads, LED trigger, alarms, and any exposed electronics will more than likely have to be replaced.

If the camera is weather-sealed and the flood happened in salt water, put a cover on the hot shoe and rinse the camera in fresh water. Remove the battery and memory cards. Thoroughly dry the camera inside and out with a paper towel and hairdryer, and hope for the best.

Most strobes separate the battery compartment from the sealed electronics in the head. Usually, you can discard the batteries, and rinse and dry the battery compartment. However, there is a good chance you will have to replace the battery door.

OLGA TORREY

Vacuum valve

OLGA TORREY

Positioning a vacuum pump in the vacuum valve

Insurance

If everything fails and you have to replace your equipment, it is essential to have insurance on all your camera gear. Divers Alert Network (DAN) offers dive gear equipment insurance that covers photo-gear floods. For more information, go to: **dan.org/membership-insurance/equipment-insurance**. ■

*Larry Cohen and Olga Torrey are well-traveled and published underwater photographers based in New York City, USA. They offer underwater photography courses and presentations to dive shops, clubs and events. For more information, visit: **liquidimagesuw.com** and **fitimage.nyc**.*

photo & video

Sea&Sea updated YS-D3 strobe

The updated YS-D3 Mark II underwater strobe by Sea&Sea has all the same specifications as the original (Mark I) model but adds compatibility and improved TTL accuracy with Sea&Sea and third-party strobe triggers. TTL shooting with the YS-D3 Mark II can now be enjoyed using the YS-D2 position on the Sea&Sea optical converter. Redesigned control dials for output and mode controls are additional features of this updated model. **seaandsea.jp**

Nauticam housing for Fujifilm GFX 100S

The new NA-GFX100S housing for the FujiFilm GFX 100S medium format mirrorless camera places all the important controls at the underwater photographer's fingertips, including AF-ON and Q controls via a double lever near the right handle, as well as Playback and DISP via a double lever near the left. The housing supports Nauticam's well-known N120 port system, thus supporting Fujifilm's GF-mount lenses. Nauticam's water contact optics, such as the WACP-2, are supported as well. The housing can optionally accommodate Fujifilm's EF-X20 TTL flash, which then allows one to optically trigger underwater strobes via the housing's built-in fiber-optic bulkheads. A classic Nikonos bulkhead supports the connection and trigger of wired strobes, but only in manual mode (no TTL). An additional M24 bulkhead provides extra output via HDMI 2.0—to an external recorder such as the Atomos Ninja V, for example, or to an external monitor (via HDMI 1.4) such as the Atomos Shinobi. The housing measures 355mm in width, 190mm in height, and 142mm in depth. It weighs 3.23kg topside and 0.05kg (including camera and battery) underwater. It is depth-rated to 100m. **nauticam.com**

Razer Blade 17 Laptop

Razer, a manufacturer well-known in the video-gaming scene, has announced its newest line of laptops, with specs that make them very suitable for postproduction/editing of large files of underwater videos and photos. The Blade 17 is powered by INTEL's fastest CPU to date—the i9-11900H, an 8-core chip with 16 threads, and a frequency of 4.9 GHz (in turbo mode). The Blade 17 can be configured with up to three USB 3.2 Gen 2 Type-A ports, two Thunderbolt 4 ports, and an HDMI 2.1 port. The Advanced Models of the Blade series include per-key Chroma RGB backlighting. The laptop can display 100% of the Adobe RGB color space, but the QHD and 4K OLED also displays 100% of DCI-P3 color. Also supported are Full HD (360Hz), QHD 2K (240Hz) and 4K UHD (120Hz) display options, with the Full HD model displaying the sRGB color space, the QHD displaying 100% of DCI-P3 color, and the 4K UHD panel displaying 100% of the Adobe RGB color space. The screen size is 17.3 inches. The Blade 17 is available in various customizable configurations, including 16-64 GB RAM, GeForce RTX 3060-3080 graphic card with 6-16 GB memory, and 1020-6096 GB SSD drives. **razer.com**

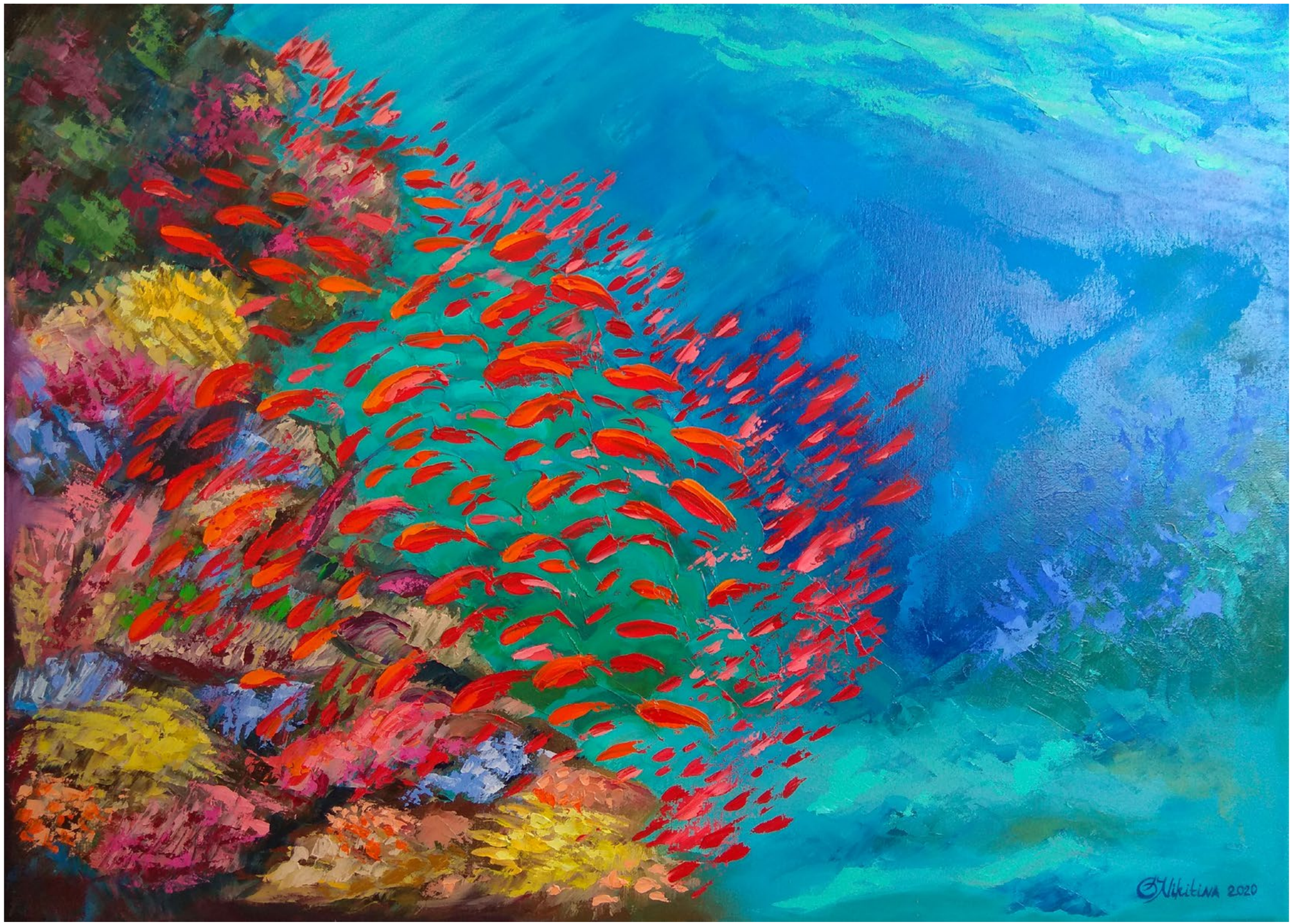
LG 31.5i Ergo IPS UHD 4K monitor

With photographers and graphic designers in mind, the 31.5-inch "Ergo" monitor by LG features a full UHD 4K resolution of 3840 x 2160px, 95% coverage of ADOBE RGB 1998, reduced color shift at any possible viewing angle, and an "Ergo stand," which offers expanded ergonomic adjustments to extend, retract, swivel and pivot the unit as well as adjust its height and tilt. Furthermore, the monitor provides USB Type-C input and output, HDMI, audio out and USB 3. **lg.com**

Isotta housing for Olympus OM-D E-M5 Mark III

Italian manufacturer Isotta has launched its new housing for the popular Olympus OM-D E-M5 Mark III mirrorless camera. Made of anodized aluminum sporting Isotta's unique red color, the housing features double O-ring seals on all buttons and removable parts, a patented single-handed open/close system, a large rear window with an optical viewfinder, and a built-in moisture sensor with LED indicator. All common lenses for underwater photography/videography can be attached via various interchangeable ports and extensions rings, which can be mounted to the 102mm bayonet-style porthole of the housing. Strobes can be triggered via fiber-optic cables connected to the ports on the housing. Optional features that can be purchased are N5 or S6 bulkheads, so wired strobes can be used. An M16 port allows one to connect accessories such as a vacuum valve or external monitor. The housing is depth-rated to 100m. **isotecnic.it**

Olga Nikitina



P O R T F O L I O

portfolio

Red Fish in the Red Sea, oil on canvas, 20 x 25cm (right); and *Abstract Underwater Seascape*, oil on canvas, 50 x 70cm (previous page) by Olga Nikitina

Russian artist Olga Nikitina is an underwater painter with a degree in interior design and a dive instructor at the Egyptian Red Sea who creates brilliant and beautiful impressionistic paintings capturing the sublime light and textures of coral reefs and the dynamic energy of marine life. *X-Ray Mag* interviewed the artist to learn more about her creative process and perspectives on art and life underwater.

Tobia Arba, oil on canvas, 70 x 50cm (left); and *Milky Way*, oil on canvas, 70 x 50cm (top right) by Olga Nikitina

Text edited by G. Symes
All images courtesy of Olga Nikitina

An avid painter since her childhood, Olga Nikitina took lessons at school in fine art and Russian traditional painting styles, such as Khokhloma, Zhostovo, Gzhel and Kudrina (which can usually be seen on Russian Matryoshka wooden nesting dolls).

She earned her degree in interior design from the Ulyanovsk State University in Russia where she studied drawing and painting for six years. However, after completing her degree, she took a break from painting—a break that would last five years until, on a trip to Africa, she got inspired to take up her brush and start painting again. She said, "I was so impressed by whale-watching in South Africa during the sardine run event that my first painting after my long break was a breaching whale."

At the same time, she said she completely fell in love with scuba diving and the underwater world. She had seen tropical fish before, while working on aquarium design, but seeing them in the wild, in their own natural habitat, gave her a new appreciation for marine life, saying that seeing them "in their real environment full of colors, different species, and endless coral gardens, just blew my mind."

Then in 2008, she got her open water certification in Marsa Alam, Egypt, and started going on dive trips to various locations in different countries and seas. In 2015, she became a dive instructor and went to work in Egypt on the Red Sea, where she regularly spent two to three hours underwater every day. She said that she drew so much energy and inspiration from the sea and marine life, "that I could not be silent—I had to express myself and my emotions in my art."

Napoleon, by Olga Nikitina. Oil on canvas, 40 x 30cm

Middle Reef, oil on canvas, 50 x 70cm (right); *Between Two Worlds*, oil on canvas, 80 x 100cm (far right), *Between Two Worlds, Revival*, oil on canvas, 51 x 61cm (below), by Olga Nikitina

X-RAY MAG: Why marine life and underwater themes? How did you come to these themes and how did you develop your style of painting?

ON: While scuba diving, I always look at the underwater marine life through the prism of my artistic lens. Or the opposite happens, and what I see goes through my eyes first, then into my heart, soul and brain, creating images in my mind. Very often, if I do not have the opportunity to immediately start my artistic process after scuba diving, I take some notes in my notebook of what I want to reflect on canvas, as well as some memories and ideas. The underwater world is so rich with different colors, shapes and patterns. The only way to capture it is to feel free to play with paints on canvas. I did not want to represent the underwater world with realism. I would say that my style gets close to underwater impressionism. I use a palette knife to paint, which makes the painting more abstract, with heavy texture and bold strokes.

The best way to feel inspiration is to be there underwater, to be a part of the marine life, to be immersed in the underwater environment. That is why I got the idea to paint right underwater, while scuba diving.

X-RAY MAG: Following in the footsteps of artists who pioneered and developed underwater painting—such as Eugen von Ransonnet-Villez and Zarh Pritchard in the 19th and 20th centuries, as well as André Laban who worked with the undersea explorer Jacques-Yves Cousteau in the '50s—can you describe your own artistic method or creative process? How is the process different when you create paintings underwater?

ON: Usually, images of underwater scenes just come about in my mind after a day in the sea, diving. Sometimes after a dive, I make notes of what impressed me and what I would like to paint at home, and I use my underwater photos if I need to see specific details of underwater life. With normal painting, I create, over a few days, several layers of colors on a canvas, and very often I get the feeling that I dive too deeply into the details and overpaint the artwork.

With underwater painting, it is a different story. I recreate the present moment, based on feelings and the mood of the surrounding atmosphere. It is more intuitive painting. I am limited by time, decompression limits and air consumption. But I prefer to finish the artwork in one underwater session, because on every following dive, there is a different environment and mood. Another specific thing about underwater painting has to do with colors. With depth, colors disappear. We lose red colors, and it is always a surprise returning to the surface and

portfolio

CLOCKWISE FROM RIGHT: *Bait Ball, Sardine Run, South Africa*, oil on canvas, 50 x 50cm; *Sardine Run South Africa*, oil on canvas, 50 x 60cm; *Firework*, oil on canvas, 40 x 40cm; *Hurry Up*, oil on canvas, 25 x 25cm; and *Ocean*, oil on canvas, 25 x 30cm by Olga Nikitina

seeing how an artwork looks. For underwater painting, I use only palette knives and my fingers.

X-RAY MAG: What is your relationship to the underwater world and coral reefs? Where have you had your favorite experiences?

ON: Underwater, I feel like it is my second home. I love the feeling of no gravity so much. I fly like a bird above the coral reef, or along a wall, and gaze into the deep blue abyss. Coral reefs, at various dive sites, remind me of big cities, with their own architecture and inhabitants. And what makes the atmosphere even more magical is the sunlight—everything shines with bright colors.

My favorite experience was on the house reef at Safaga, Egypt. An underwater painting session usually lasts from 60 to 120 minutes. On this particular dive, I sat in the same place, and all the fish got used to me and came very close to see what I was doing. I also had several nice experiences with

Delight, oil on canvas, 50 x 70cm (above); and *Underwater Rain*, oil on canvas, 35 x 45cm (right) by Olga Nikitina

a lionfish and a green sea turtle called Henrietta. The lionfish looked at my artwork like a professional art curator, and it felt like Henrietta was posing like a model in the 60 minutes she spent around me. Triggerfish liked to play with my color tubes like dogs with sticks. I always had to watch that they did not steal my paints!

X-RAY MAG: What are the differences in painting underwater scenes in South Africa and the Red Sea, or other locations?

ON: Even though I have dived many different locations, the opportunities to do underwater painting are mostly in the Red Sea. Conditions are most appropriate here for it; the water is warm and there is great visibility, colorful reefs, and lots of brightly colored fish. In South Africa, the ocean is more tough, and diving conditions are much more difficult. There is strong current, very often bad visibility and cold water. But for creating shark, whale or seal masterpieces, it is the right place.

X-RAY MAG: What are your thoughts on ocean conservation and how does your artwork relate to these issues?

ON: Dive instructors are servants of the sea. We introduce other people to another world, another reality, and teach them how we should care about the ocean and respect marine life. My art is just one of the tools to do this effectively.

X-RAY MAG: You were recently quoted in the press saying that art is your language, that you would

Pink Coral, oil on canvas, 50 x 70cm, by Olga Nikitina

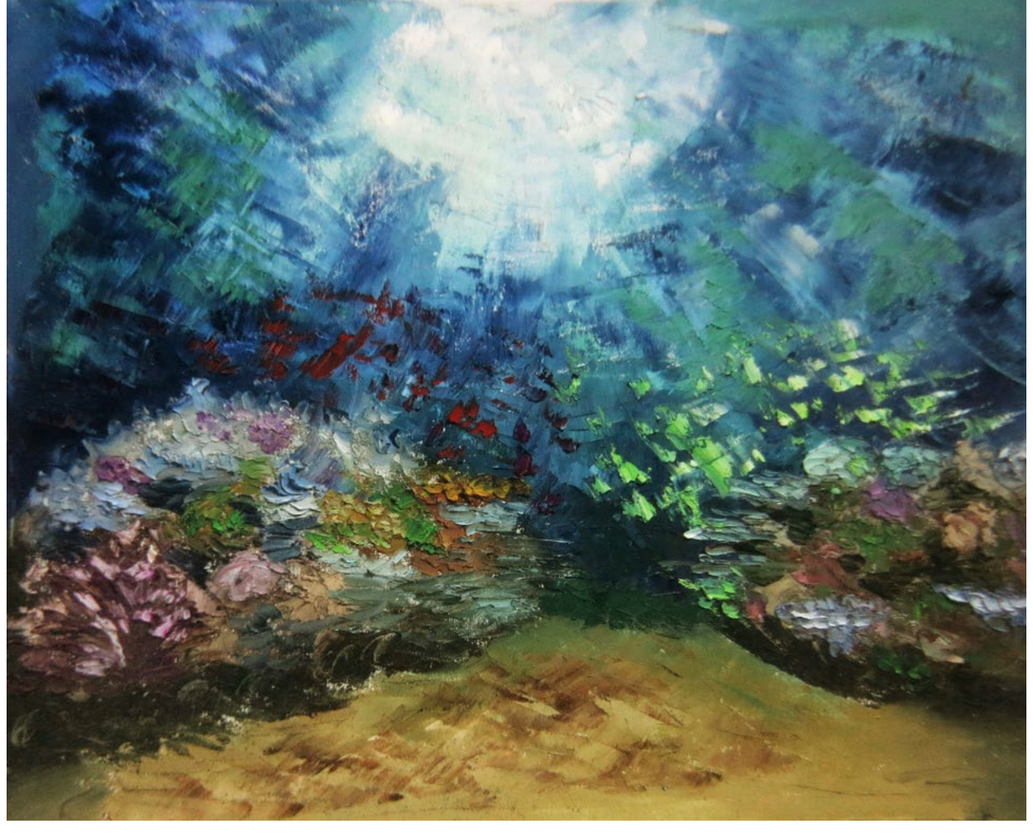
portfolio

Sunny Day, oil on canvas, 60 x 70cm, by Olga Nikitina (right), was created underwater at a depth of 8m for 120 minutes.

Happiness, oil on canvas, 60 x 80cm (far right), was created underwater by Nikitina at a depth of 10m for 120 minutes.

Underwater Firework, oil on canvas, 50 x 70cm, by Olga Nikitina (bottom right), was created underwater at a depth of 7.1m for 100 minutes.

Dream, oil on canvas, 60 x 80cm (below), was created underwater by Nikitina at a depth of 8.1m for 106 minutes.



like to help viewers of your artworks "find their soul, love and kindness through the reunion with nature," and that you would like to introduce the underwater world to art lovers, and conversely, divers to art-making—to encourage people to protect the oceans for future generations. What are the challenges or benefits of being an artist in the world today? Any thoughts or advice for aspiring artists?

ON: Being an artist is a big gift as you have an additional language in which to communicate with nature and society. But the modern environment is quite aggressive and stressful. It is not easy to stay relaxed and inspired, and this is the challenge. However, communication with nature really helps one to reach a

Stream, oil on canvas, 30 x 40cm, by Olga Nikitina, was created underwater at a depth of 6m for 80 minutes

Olga Nikitina

meditative state and be creative. I would recommend spending more time outdoors, while painting—and for all artists, especially beginners, to trust yourself, believe you are special, and work from your heart with love!

X-RAY MAG: How do people respond to your works?

ON: I have had good feedback from both adults and children about my art. Each painting is a little story of mine, and everyone can find one of my artworks that speaks to them and creates some nice memories for them or reminds them of an exciting experience. Divers want to try for themselves how to make art, and artists want to try diving. It is the best reward for me if I can get people interested in both: diving and art. I have had students who have tried underwater painting with me, who had never tried to make art before, and they created great artworks. That was a wonderful interaction.

X-RAY MAG: What are your upcoming projects, art courses or events?

ON: At the moment, I am developing a series of masterclasses for all levels of oil painting with underwater themes. In 2019, I registered a distinctive specialty with PADI: Underwater Artist. Now this course is available on a few liveaboards and during daily dives too. There are two options: The first is an underwater painting introductory dive, in which we create artwork underwater on one dive; and the second is a full course, which takes two to three days. After completing the course, the diver-artist will receive a PADI Underwater Artist specialty certification.

I am also working on a new series of paintings related to ocean pollution and mass fishing, and I hope to soon be able to exhibit some of my artworks.

X-RAY MAG: In recent press coverage, you said that when you began underwater painting you tried to capture underwater scenes, coral reefs and sea life, as well as the mood of the environment, but now you focus more on tapping into your subconscious and your feelings in a more intuitive type of painting, which is more abstract. You have plans to experiment with diving depths and canvas size, as well as a project bringing a group of divers together to create one big artwork underwater, showing the diversity of the underwater world on canvas. Is there anything else you would like to share with our readers?

ON: I am happy to share my passion with you, my dear friends, and I am open to any projects related to art and the ocean! ■

For more information about artworks and courses, visit the artist's website at: ***olganikitinart.com***.

Abu Soma Garden, oil on canvas, 60 x 80cm, by Olga Nikitina (above), was created underwater at a depth of 10m for 120 minutes; *Soft Corals*, oil on canvas, 80 x 60cm (left), was created underwater by Nikitina at a depth of 10m for 120 minutes